NEWS IN BRIEF **Trouble looms**

limes over new technology is again looming, eight months after the newspaper's suspen-tion was ended in relative amily.

Times management is pressing the NGA, the typesetters' union, to discuss direct input of text by journalists and advertisement staff, while the union refuses to enter such talks, claiming it has a monopoly of keyboarding for three years.

Prescriptions trial

of practice governing personal data in files should go ahead COMPUTERISATION of part of the Prescription Pricing now, to test their practicality Authority is to go ahead as a trial to see whother the whole before they are embodied in legislation. That is the recommenauthority should be similarly dation of the National Computer Users Forum, tentatively endorsed by a partial survey of automated. Studies on alternative ways of doing this have members of the National Combeen going for some time (CW, October 19, 1978). The authority puting Centre. The forum has told the Depays chemists for the prescrippartment of Industry that it is "gravely concerned about tions they dispense.

Power monitor

THE Hunterston nuclear power station in Scotland is to enhance its plant monitoring system with two Honeywell Level 6 Model 43 systems. Linking with existing 316 real time interface equipment, they will provide plant control room staff with status information about the plant's information about the plant's two reactors and generators.

Data entry boost

entry and file inquiry at up to three work stations has been added by NCR to its Intel 8080based 8150 office computer. Called Multi Work Station Direct Processing Systen, the software rents for £330 a month

OBE for viewdata inventor SOFTWARE to support data INVENTOR of viewdata Sam version of viewdata (CW, De-

Sacked salesman sell Jacquard kit

THREE sacked Jacquard salesmen and three others have gone into business on their own to distribute the firm's word processing and they worked in closed down (CW, June 12).

The Knightsbridge-based firm, called Wordats, is headed by former Jacquard London brench manager Mario Guzzetti, who was offered a distributorable by his old firm.

voluntary codes

the proposed codes of practice

until sufficient experience is es-

tablished." The NCC members

said that, in the absence of

government action, voluntary

codes would be acceptable.
Only 10% of NCC members

were questioned in the survey; Of the 200 respondents 90% felt

there was a need for some form

of privacy regulation soon, 75%

were in favour of legislation, but

only 50% regarded a statutory

Fedida has received the OBE in the Queen's Birthday Honours. The award follows closely on that of the MacRobert Award for technological innovation which went to Fedida for his work on Prestel, the Post Office

tions and changed its name

Other honours include a life peerage for Sir Arnold Weins tock; managing director of GEC.



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Swedes plan guidelines for technology

A WATCHDOG has been set up by the and privacy. There are already several Swedish government to study how computers are being introduced in Sweden and draw up guidelines for usage and develop-ment of new technology. A combined policy for industry, government and society at large will be worked out, and when thought necessary legislation will be recommended

The aim of the committee, called the Data Delegation, is to get a clearer idea of what again at Times

dustry, government, and society, covering such areas as unemployment, working conditions, the distribution of power in society,

ordinate their efforts.

The delegation does not fit in a formal way into the Swedish constitution but it is considered important enough to have a Cabinet Minister as chairman Olaf Johansson, the Minister for the Budget. The 15 members consist of MPs from all five parties, regional and local government officials, and trade union representatives. Also there will soon be seven full-time staff.

The committee will probably not have any official power apart from its co-ordinating

Only half of the members

replying had studied the practi-cal implications of the Data Protection Committee's recom-

mendations on their businesses.

One-third had assigned respon-

sibility for privacy to someone in

The forum has also recom-

mended that codes of practice

should encompass manual sys-

tems as well as automated ones.

but two forum members — the

Central Computers and

Telecommunications Agency

and the Mail Order Traders

Association, dissented from this, stating: The Mail Order Association and the Building

Societies Association both felt

that codes should be voluntary

and that legislation should "only

bodies working on these specific areas in have money to spend; its main influence Sweden, and the Data Delegation is to co-would be in proposing legislation and regulations. Some of the exiting agencies, such as the Data Inspection Board, are understood to be worried about interference from the delegation.

Delegation staff say it might have been a good thing had the body been established five years ago. The sort of problems that could have been avoided include eye strain in workers using VDUs and a reduction in the traditional free availability of Swedish government information to citizens since much administration is computerised.

Go-aheadurged for Ganada books 20 stands 20 stands at Compec

THE largest stand yet booked at Compec has been reserved by the Canadian government for its Department of Industry, Trade

and Commerce.

Nearly 30,000 sq ft, the area of 20 stands, has been reserved for Canadian exhibitors, and many will be taking part in a UK technical exhibition for the first

technical exhibition for the first time.

Compec, the UK's major show of computer equipment and development, is at London's Olympia from November 4 to 6. This year's exhibition will be the biggest so far, with the Grand Hall and gallery completely full. So far 380 exhibitors have booked 766 stands and only a few units are now available to few units are now evallable to enable latecomers to take

epace.
Last year's record attendance was 34,745, 22% up on 1978, the first year that Compac was held in Olympia. It is expected that 1980 will surpass those totals.

Advance tickets at £1.50 sech can be ordered from IPC Exhibitions Ltd, 40 Bowling Green Lane, London, EC1F ONE. Tickets bought at the doo

Change • From front page consideration the options of

memory products.

will be based on 2,000 to

starts a week. Capacity ##

projected UK factory wollk double that.

At present the research

at Bristol employs about the people but recruiting his help hindered this year becaused uncertainty of the future of the future

TRAIN

to it.

Strings that may be attact to any further State funds could swing the Immos directions of the Immos directions. to take the whole project out the UK and base all future velopment at the US site at 6 rado Springs.

Denial of

Although the government appears undecided about the worth of Immos, the comp ahead of the field with its h static RAM, the IMS 1400, wir. it is expected to start sample towards the end of this me Intel, the only company with comparable product, is upto

stood to have scheduled by sampling of its 2167 for thems months of 1981. That is about the time is

Inmos hopes to start samplities 64K dynamic RAM. Described work is also well ahead on our Work on the company page at Cheyenne Mountain. Colorado Springs, is up to statute and planned output the

System 38 Cobol

CSS layoffs

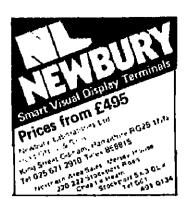
NATIONAL CSS is merging its computer marketing and time sharing divisions in the US and making big layoffs. The combined division will market both remote time sharing services and the NCSS 3200.

Number 712

Thursday, June 26, 1980

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\$412m deal for Honeywell

HONEYWELL has been awarded a new 9-year maintenance contract by the Pentagon on the 35 ageing Honeywell 6000 mainframes that form part of the US Air Force's world wide military command and control system, WWMCCS. The \$412 nillion contract includes \$100 million worth of hardware

The much criticised WWMCCS achieved further notoriety recently for generating two "Soviet attack" false alarms. They have been attributed to a defective chip.

16-bit Level 6

HONEYWELL is working on a 16-bit microprocessor version of its Level 6 minicomputer, folowing the path set by Texas Instruments with its TMS 9000 and Data General with its Micronova. Smallest Level 6 processor currently available is the 6/23, which is an AMD 2901 bit-slice emulation of the basic

IBM has announced an Ansi 74 Level 2 Cobol compiler for its System 38 business database computer, hitherto only offered with RPG III. The compiler, corting £85:20 a month will be available in 1981.

MP calls for national Info Tech plan NATIONAL strategy for information ment on Information Technology in the UK use of Prestel, and more computers in the

between our fingers." That is the proposal put to Industry Secretary Sir Keith Joseph by Kenneth Baker MP, chairman of the Conservative Backbench industry committec. Sir Keith reacted sympathetically to the proposals, Baker told CW, and is now awaiting reports on further action by his

The elements of IBM's ne ? word processor, the Display-writer, are shown here. Only

announced in the US so far, the Displaywriter features a 50,000 word dictionary used for automatic checking of spelling. Users can add another 500 specialist words of their own. The configuration shown here gosts about \$10,000.

Micro details of the Display-

ritier can be found on page 3.

The watting is over - sconiact your

awaited 132-column matrix printer

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with high-resolution graphics,

According to Baker, a single policy docu-

technology should be set up by the govern- in the 1980s needs to be produced as an Health Service. These should all be procured ment right away in order not to let the outline of the strategic thinking of the industry, to show the opportunities that exist and how they can be maximised. Baker also reiterated the call for the appointment of a criminate against the services industry; an

diverse parts of the industry together.

The government should take a lead by introducing more information technology into its own operations, Baker said, for

IBM aims for bigger

Baker's other proposals include adjustment of corporation tax so as not to dis-Minister for Information Technology to act as a focal point in government to draw the ment; and promoting by the new minister of technology agreements with unions.

The new ministerial post would not entail extra bureaucracy, Baker said, because the departments involved already exist.

get incentives to push the word processing products of rival

As well as the new stand alone

Displaywriter from office pro-

ducts division, which has a base

price of \$7,895, IBM has added

arithmetic and file processing facilities to the 5520 shared logic

word processor from general

systems division, and an-

nounced that from next sum-mer, users of the 8100 dis-tributed processor will be able to

run the 3730 word processing

software under its DPCX

Only the last has been an-

nounced in the UK so far. The

5520, discussed two weeks ago (CW, June 12), is not yet avail-

The US announcement is

accompanied by a "statement of

direction" from IBM which says

Turn to page 5

WP slice

Ferrunti to be sold to a foreign company, because of its trategic importance as a defence supplier, Industry Secre-tary Sir Keith Joseph has an-nounced. He has made no other commitment in advance of this veck's decision by the Cabinet terprise Board's shares in the company, following publication of its annual results. Sir Keith made it clear, how-

ever, that he dislikes the idea of selling to anyone other than the highest bidder, despite fears that a takeover by a giant such as GEC could lead to the closing down of much of Ferranti. Scottish finance houses have prohe company under a restrictive covenant that would keep Fer-ranti independent for an initial period of two or three years.

Staff at Ferranti's Scottish factories are particularly wor ried about a takeover, and ministers at the Scottish Office, known to be sympathetic, have been pressing this point with Si

DEC shortages

A HOLD-UP in the full produc tion of Digital Equipment PDP-11/44s has created a serious shortage of PDP-11/34s accor-ding to two of DEC's OEM customers, Bunzi Data Systems and CBS Consultants of Birmingham. The 11/44 is intended to supersede the 11/34 and offers wice the power at only 10%

principal supplier and data pro-cessing, general systems and OFT, ICL agreement is 'a sell-out'

AFTER several years of com-virtually worthless following the he Office of Pair Trading to change some of its practices relating to the maintenance of old machines and the attach tent of non-ICL hardware to 2903s and 2904s.

However, the changes are far from satisfactory according to some of the complainants and ICL is still the subject of an nvestigation by the EEC Com-

The most significant aspect of the limitation of guaranteed most machines. John Young of ICL about the maximum Computer Resale Brokers, the guaranteed maintenance period. nost vociferous of the com-

plaints by users and manufac- launch of the ME29, and he on the ME29 was only five years so that ME29s would lose all their value even quicker than

TO help it win a bigger share of

the word processing market in the US, IBM has launched a low

major changes to its traditional

sales policy. Meanwhile in Europe it is offering OEM peripherals for the first time. Stung by the way it is Number

cessor market, IBM is now en-

abling its customers to buy word

processing equipment from whichever division is their

However, one significant change made by ICL is that it will no longer apply a 20% surcharge for maintaining machines that it agrees to service after the seven-year conhission that started in 1978 tractual period is complete: Stuart Gould, chairman of the iCL Computer Users Association, said that this would be welcomed by users but added they would continue to talk to ICL about the maximum

The OFT itself said in its lainants, has described the statement on the agreement agreement between ICL and the that it reserved the right to re-OF that is sell but, it is said that appendix discussions with ICL if ICL maintenance policy had "new significant evidence apprendered old 2003s and 2004s ears".

INSIDE THIS WEEK'S CW....

Computerview
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Fedida led the Post Office

men who were trained pro-

team that developed viewdata in the early Seventies. On his retirement in 1978 he became a

tor. He is now an independent Another OBE goes to Steve Shirley, chairman of F International She founded Freelance Programmers in 1962 to provide An MBE goes to Cecil Rick-erby of the Operational Propart-time work at home for wogramming Department at the Post Office Telecommunications

consultant to Insac, the NEB subsidiary marketing viewdata in the US. When these operations were extended last year with the formation of a new company, Aregon International, Fedida became technical direc-

grammers but who had given up their, jobs to raise families. This proved a highly successful venture and in the early Seventies, the company expanded with the establishment of systems operations and changed its name to K

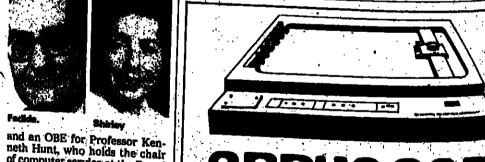
International, Mrs Shirley is also a leading member of the BCS specialist group for the disabled

GEC picketed PICKETING began on Tuesday Coventry where 200 System X development engineers have been locked out during a dispute about pay and conditions (CW June 12). ASTMS has made this dispute official.

of computer service at the Royal

Military College of Science, Shrivenham, Wilts.

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computer Weakly has a circula-tion each week of over 96,000: including the highest fully requi-cated circulation in the UK.

Computer Mankly in start trad of niturys in the surviving categories in line lift and Sinn politic Computer and Computer and Sinn politic Computer and Computer a biole gamente i para all Burde gamente i para all

COMPUTERVIEW

week is that, while the latest attempt to establish an annual pan-European exhibition dedicated solely to software is being staged by a UK company, the venue chosen for the show is Paris (see Software File). One does not need to look far to understand why.

IDC Eurocast has produced a study on European software and services 1978-821, which lists the top 50 companies in the field in Europe. Figures are for 1978 and, needless to say IBM is number 1. But the next four are all French and include GSI, the software and services offshoot of CGE; the Cap-Gemini-Sogeti group; CISI and SG2. These together did business totalling \$435.8 million, as against IBM's \$394.4 million. The rest of the top 10 shows Gelsco of the US, two more French companies, Datev of West Germany and NCR, also American. A French, a Swedish, a US and a Swiss

company are ahead of the first UK entrant in the list, BOC Datasolve, which is Number 15. Computer Management

Relegation threat place, followed by Scicon, 40th, Logica 43rd and Centre-file 44th. France has 14

and even Denmark has four. Dr Chris Wilson's drive to expand ICL's software and service businesses at a much faster rate than the overall growth of the company has come none too soon. But as in the training field, itself a service, the rest of UK industry seems largely to

companies in the top 50, UK has five -

be content to let ICL make the running. In the debate which started two years ago about the microprocessor and all its works, little attention was given to key significance of software and software skills. While the Microprocessor Applications Programme allocates capital for development, what beleaguered microsoftware and systems houses really need

parts abroad will play an increasingly significant role in the computer industry of the 1980s. Yet, as Martin Banks pointed out (Micro News, June 19), they are being squeezed by dealers out to make a killing, and by customers, parti-

cularly big companies, who never pay their bills until the last possible moment. The government has said that every assistance should be given to small businesses—and few businesses have more potential than the small systems houses. The kind of assistance they need is much more than money for development of applications which may or may not be of applications which may or may not be of any value, is support once applications have been demonstrated to be successful.

Few dispute that micro software will a very big industry by 1990, But in much of it will be British? Far better a tax or VAT holiday for the first five years of trading than grants.

pioneer of mainframe computing to software and systems companies (a) head start in the international ties offer ancillary services. Despite this re-French are now way ahead.

The UK, France and West General have tended to dominate the Europe owned market for computers and the puter services because size of markets an important determinant in the rate which a country could afford to app large and expensive computers.

It is just as easy to start a success. microcomputer systems house in Holise as it is in the UK and — if the fig. climate is more congenial there than the UK — Holland, Belgium or Denual may well produce the micro soften giants of the 1980s while the UK remission. a country of minnows.

*Services and software 1978-1982 (896.) Europa Ltd (CW), 2 Bath Road Chint London, W4 1LN. Tel: 01-995 9222 Because the UK was the European

LETTERS to the EDITOR

TPS3 is to save K, not to threaten it

mention of our product in your pages I must protest at your headline, "TPS extensions a threat to VME/K" (CW, April 3).

If I have been saying anything coherent for the last four years it s that for the prospective user of 2900 machines in a TP environment VME/K is not just a good thing, it is THE good thing. This I believe because the underlying philosophy of the allocation of resources in K makes for the est possible application of the basically unfavourable VM environment to TP systems.

Quite contrary to your headline, our purpose in announding TPS3 at this time is to save K, not to threaten it. If there is a threat to K it must clearly come from the ME29. With notices in the Press speaking of processor power up to five times that of a 2904 and main store sizes of up to a megabyte, notly followed by the

HAVING spent the last two years selecting, training and placing junjors in data proces-

sing, may I comment on F. J. Perkins' letter about the alleged

failure of universities to provide suitable people for the industry (CW, April 10).

The "natural" will dome through smelling of coding sheets and core dumps from any point; but the bost effective solution for which your correspondent is looking does

Alfactive solution for which your citrespondent is looking does not lie in public sector education, whose basic rateon differ la lot geared to such an operation. It my experience, the formula for providing Juniors which F. J. Perisha demands is as followed. Risorous and uncompromising selection by practising DP Drofessionals (our lines acceptance is in the processionals (our lines acceptance is fully soldered to los of the citates section who rises in the section delegate as often obligate in the section of the

A formula for

finding recruits

gap in the market for 2900s under VME/K would appear to be shrinking rapidly. But why, you may wonder, should I care about the denise

or otherwise of VME/K, given that our own product, TPS, is very happy in any of the available environments? To underincreased if a large proportion of potential users are holding back development of terminal- Telecomputing, oriented systems to await some Oxford. Utoplan environment announced but not quite available

What causes me concern, therefore, is the announcement

using academic achievement as a main entry qualification);

Intensive training over a period of between 14 and 22 weeks,

again by practitioners with

experience of latest products and techniques;

Placement in a post suited to the student's ability and personality and personality and personality as systems or programming, user or software house.

The next question must be:

2956 models 20 with TME, the rates". This use of the present tense should really be controlled by advertising standards! Setting an objective and commencing the recruitment of a development team should not be allowed to equate to the possession of a product.

The real significance of TPS3 is that serious users can constand this you must recall that we, along with a handful of use serious TP systems now, and other brave adventurers, eventually run them on whatactually market micro- ever stable base actually reaches processor-based terminal sys-full development. Please, ICL, let tems for ICL machines. The it be K; at least that is just hazards of this activity are only around the corner ... or is it? JOHN GARRICK

Relational **DBMS**

IT is good to see Computer Weekly back again, but I was surprised to see the headline "Relational Databases Just Around The Cornet" on an NCC report (CW, June 12), Logica's relational database

system Rapport was launched eight months ago; with over 40 systems sold now, it is hardly 'just around the corner's I should like to correct any. impression your readers may have that relational databases;

are a thing of the future. Rapport: does not implement the full Relational Algebra, but ment has sponsored my work so to walt a few years for the systar, it cannot be expected to pay tem of their dreams. In the far it cannot be expected to pay tem of their drams. In the thic full bill and we are currently meantime, Rapport certainly fits discussing with a number of Dennis McLeod's description of clients this user group idea in relational as "flat files independent which we can put up a cost dent of data and a high-level of flat and a high-level of fla

- Print Hills

The property of the property o

Opportunities for non-whites

ALLEN COOK expressed his computer industry is propile views about South Africa with no different from others in unambiguous phrases (Letters, respect). Moreover, I sawa June 12). However, he may have misled readers about the real state of affairs. Although I law, recruiting, training a understand Mr Cook's feelings using black, Asian and color (especially since he has decided men and women without the not to live in that country in judice. defiance of apartheid), I feel his Thes attack on Mr Gray (Letters, couraged. It is unworthy of

burg I heard Mr Gray speak at a conference about the opportunlties which now exist for nonwhite computer staff (and the

myself how organisations at within the framework of the These attitudes should be

the software. A configuration with daisy-wheel printer and two floppy discs is the minimum which is February 7) and people of similar attitudes is quite unjustified.

During a stay in Johannesor not. competitive with other systems and will cost \$10,070.

M. V. E. MOOF



Tel (0272) 25921 Telex: 449205

Bitter blow struck for PoS in pubs

THE new look in point of sale terminals in evidence at EPOS 80 exhibition in London was units with five-inch VDUs instead of with hydrician value in the single-line displays. Attacking a highly specialised market was one of the latest developments, an electronic till for pubs and restaurants with a wide range of sccounting and stock control

cilities. The distributors, Zonal, a new Edinburgh-based company, elineary has some large brewaries interested in this machine, which has dedicated touch-sensitive keys for most frequently ordered drinks, with price information stored inside.

Office

by IBM

Office System 6.

from office products division, which effectively kills the

The Displaywriter consists of

a CRT display which is claimed

to be almost flicker-free, driven

cycles at 200 nanoseconds and

has a 16-bit bus. In the US a

basic system with one 284K-byte

floppy, and printer with Selec-

tric typewriter mechanism will cost \$7,895 plus \$15 a month for

Up to three screens can be

linked in a cluster sharing a

printer and clusters can be

chained. Screens with 160K-

bytes of memory cost \$3,310 and

maximum main memory is

224K-bytes, Price for 64K-bytes is only \$900, adulvatent to \$14,400 per megabyte. Memory chips are 16K-bit.

within the limitations, users can

mix and match at will. First de-

to the 5520 word processor so

that users can produce things

like management summary reports and budget preparation.
Also added to the 5520 is

bisynchronous communication

with a local or remote, IBM

The only part of the announcement currently offered in the UK is the facility to run the word

processing software developed for the 3730 on the 8100. The

8100 is the much more powerful replacement for the 3790 dis-

tibuted processing system, and the software, called Distributed Office Support Facility, runs

liveries are in January 1981. From general systems divi-sion, file processing and arith-metic software has been added

The system is modular and,

Less frequently sold drinks are entered as two-digit codes, and stock records in the machine are automatically reduced with each sale. A repeater television display can show the customer the da-talls of his order as it goes along.

Other new point of sale terminals were on show from Real Time Control, Feigh, Quality Systems International and NCR. The NCR 2152 department store system is entirely "soft", so it can be customised for each installation. It has an alphabetic display for operator prompts and check-digit verification.

QSI is a new company whose

leader is Alfredo Sarich of the commission.

"There will be one year for

specification of the system and

one year for the experimental

link to operate," Sarich told

Computer Weekly. "The con-

and run the sentral system is

worth 110,000 units of account

An existing bureau computer

is envisaged as the central sys-

tem, supporting a terminal in

each country, not necessarily at

the participating port. The ports involved are Antwerp, Bremen, Copenhagen, Genoa, Glasgow,

Hamburg, Le Havre and Rotter

"The capacity of the system i

allings and a database consist-

ing of the characteristics and

relevant history of individual vessels will be compiled. These

will be chiled from the Lloyd's of London database. A series of

statistics on each sailing, giving

details like times of departure and draught, entered before the

A second part of the project is a feasibility study into adding a

dangerous goods reporting sys-tem to the movements database.

This will involve finding

universal means of notifying

destination ports of dangerous cargoes coming in, and examining ways of improving the handling of dangerous goods

within the port area. It will use

standards already drawn up by international bodies.

The allocation for it is 400,000

units of account (£250,000) and a study team under Captain Stender of Bremen and made up

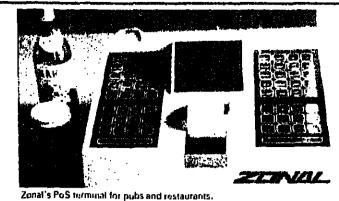
of ports personnel is to handle it.

The third part of the project
will be the realisation of a final
data processing and transmission system in EEC ports," says

to be of the order of 20,000

— about £85,000."

by a microprocessor which tract to develop the software



terminal, built under contract by Plessey, incorporates a bubble memory for the price look-up table, two electrosensitive printers, a 16-character siphs-numeric display, and a 3M date cartridge unit for recording trans-

Case introduced its Midnigh Modem, a 1,200 bps unit specially designed for automatic night-time date collection from PoS terminals by a central com-puter via public telephone. It is faster than equivalent Post Office

Association of the Retail Trade, both of which have declared their opposition to bar coding. **EEC** to back Euro Scholze's firm has developed an omni-directional OCR scanner which can read article numbers on goods printed in either OCR-A or OCR-B fonts. The object cannot be moving challenge ports data system while the number is read as with laser scanners - it has to stop for a moment on a glass reading plate — but the numbers can be oriented any way while it is being read. Scholze claims his THE £11/2 million project for a European ports information system (CW, June 19) is to be based on a central computer supporting a terminal installed in each of the participating EEC countries. The project is being backed by DG II sections of the EEC Commission, and project system can be operated just as

favour of OCR kit-

BAR codes and laser scanning for point of sale systems should A maximum of 13 digits is be halted and OCR scanning inavailable, while the Scantron troduced in its place as cheaper and more convenient.

That is the view of Hans

scanner can read up to three lines of 14 alphanumeric characters each. Bar codes also Scholze, managing director of require high precision in printthe West German company ing while very crude printers can produce OCR type, Scholze Scantron, backed up by the West German Federation of Industry and the West German The Scantron machine uses a

television raster scan rather than a laser, and special hardware for decoding the image. A single solid line is needed under the printed number to show the scanner which way up the number is.

Gordon Strickland of Sweda, manufacturers of point of sale terminals that can be interfaced to any reading device, commented that the requirement for bringing each object to a stop would make the OCR system unsuitable for checkfast as a laser scanner and is outs, and that bar codes have cheaper and saves expense in too big a head start.

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French buy Logabax electronics group Intertechni-It is reported that Electrobel

makes office computers, ter-

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ACQUISTIC

que is to take over control of will retain a 20% stake in the Logabax from the Belgian Electrobel group.

The computing division of intertechnique, which builds OEM minicomputers and Réalité business systems, is likely to be merged with Logabax, which business office romputers that the rest of Dassoult with a personal hol-ding of 19%, in addition, Elec-topel is to take a stake of about 8% in Intertechnique through an issue of new shares:

Logabax made a loss of about \$4,5 million on rurnover of about \$52 million last year. The combilities in the combined in the combined in the company will have an annual turnover of over £50 million.

Wrong note

I REMEMBER years ago my father trooping around shops refrigerators or whatever, and on being shown the latest model with all its fancy feu-tures, remarking sourly, "I suppose this one plays a tune." Nowadays of course, he would

stand at an exhibition the

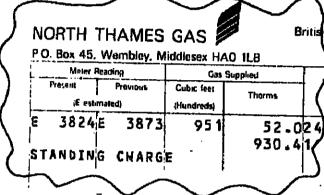
behold, was an electronic cash register which played a tune.

I asked the chap on the stand what the purpose of the tuneplaying was, and he replied with refreshing candour that he had no idea."

The speaker on the machine e right.

I was strolling past the Sharp

is principally for repeating to
the world in a Dalek voice what the total is that is already other day and there, lo and shown on the digital display.



USED to wonder why it was always the Gas Board that was the but of computer streetly lokes. This bill which Mrs Wilson of Edgware has just received shows why. According to the North Thames Cas Board, 3824—3873 = 951. Apparently the "present" reading was not estimated but was an actual one. Be that as it may, hands up the naughty programmer who forgot his overflow routine!

Date a cow!

WORD reaches me from Ontario that an enterprising firm has started a computer dating service for cows, to enable our bovine friends to find suitable partners for rolling in the hay, I hope it works better than the corresponding human services. I will refrain from making any related remarks about the companions these have produced for me.

However, I am reminded of the story about the small boy at the country school who was late one morning. When quizzed about this by teacher he replied, "Oh, I had to take the bull to the cow."

"Can't your father do that?"

"Oh, no, it has to be the bull,"

MICHIE'S PRIVATEVIEW

AFTER my arrival at Rugby School at the age of 13, 1 and a fellow inmate were selected by the Head of House to be his fags days might surmise, on account of our personal attractions or fawning demeanour, but be-cause of our known readiness in theological discussion.

Our 17-year-old master, a lectual intensity, in later life became a Jesuit priest. Now, however, his restless inquiries were frustrated by total unwillingness on the part of his contemporaries even to listen, let alone discuss with him his con-

cerns about religion.
I and my co-fag, now a Companion of the Bath and solicitor to a group of government departments, much preferred a Saturday evening of obligatory theoretical sparring to the nor-mal duties of polishing boots, cleaning windows, blanco-ing belts, scrubbing the floor, and

other such chores. The details have faded, but the antithesis between science and religion was central. Memory returned recently when I took part in the 1980 Science and was stirred also by memories of a different kind and time on meeting Sir John Foots. meeting Sir John Eccles as Durham. For example, once fellow-speaker, now in his bolsterous seventies.

As one small post-graduate dot in a vast crowd, I attended in 1952 the great neurophysiologist's Waynflete Lectures at Oxford. He interwove profound factual analysis of the based on moral grounds quite brain with dualistic mystifica-independent of speculations tion (so we felt) concerning the about consciousness. We can mind. At his last lecture an extra decide that it is wrong to make a slide was unaccountably projected on to the screen. Before first having to settle such quesour eyes hung a brilliantly. tions as whether a cat is executed pen-and-ink drawing conscious, or has a soul, of Sir John and assistants strug-gling with a recalcitrant Ghost in the attempt to re-insert it into the Machine. Some impudent unbeliever had tampered with his slide sequence.

'Man's brain is the Head of House to be his fags (personal slaves) — not, as readers of Tom Brown's School-days might surmise, on account his mind is the raven-haired beanstalk with hollow cheeks and tireless intellectual intensity, in later life became a leavily and the later life

to philosophise, but to give an account of the current state of great library of Alexandria, development of artificial intelto emphasise that the ultra- image suggests. threatening to human autonomy than the humanly responsive creations of AI.

robots have been developed to a sufficient level of intelligence for the question to make sense,

The matter will become further complicated at such future time as an expert system can capture the specialist skills of a world expert in such faithful detail that, although he may

I asked him if this still sum- now be dead, colleagues and marised his position on the mind-brain problem. You could tem recognise his personal style say today" he answered "that of thought and respond to the man's brain is the computer, foibles and fancies of the thrilman's mind is the programmer. ling intellectual companion A person cannot choose the whom they knew. To wipe out particular computer God gives such a system irretrievably, him. He must simply do his best rather than archiving it, was. unanimously felt My brief at the forum was not reprehensible. One participant

attributed to Julius Caesar. Perligence and its applications. I. haps, though, the desecration arranged my presentation so as would run even deeper than this clever machines of mainstream Perpetuated fragments of res-.computing are a great deal more ponsive behaviour surely have a claim to sanctuary deeper in nature than the claims which can be advanced for books, pho-

tographs, tape-recordings and other passive relics. It was over the phenomenon of computer induction that philosophical feeling was truly aroused: For those who find computing technology disturb-



Professor Donald Michie is head of the Machine intelligence Research Unit at Edinburgh Uni-

ing, comfort is derived from a slogan that goes "You only get out what you put in!", and even more comfort from another, which goes "A computer ca be creative!" As best ! could, I deflected the stream of collective anxiety to the point where it properly belong, namely to the nature of the new computational structures Are they to be black boxes...

white boxes . . . grey boxes?
This is the issue to which social concern, and ultimately legislation, will need to be

Honald Takie!

From Computer Weekly of June 25, 1970 . . .

WORK on a new 125-acre head- new European computer is work on a new 125-acre head-quarters site at Cosham, Ports-mouth, for IBM is to start before the end of the year. The first Honeywell 4200 to be installed in Europe is now operational at the New Southgate computer centre of Standard Telephones and Cables in London. Talks have begun between ICI, and CII on a

Fax to Canada in just over a minute by satellite have to stand again! BY 8 constitutional quirk, the fin- have to go through the bellot box stitute of Data Processing.

become a major international already established RCA Q-fax public facsimile service was aunched last week between London and Toronto. Operated by the Postal Business side of the postal authority under the name intelpost, the link is by satellite between selected post offices in the two cities.

Inaugurating the service Ron Dearing, chairman-designate of Postal Business, said the UK saw this as the first step in an internutional network; but the US Federal Communications Commission has rejected proposals for intelpost put forward by the US Post Office and RCA Global

The original plan was for Intelpost to come into operation last year with links from the US to the UK, France, West Germany, Holland, Belgium and Argentine. Iran was also among the countries that had indicated an interest in the service.

However, the FCC rejected tariff proposals put up by RCA, and another major telecomms company, Western Union International, protested to the to seven hours during the nor-Commission that RCA pricing mal working day.

between RCA bureaux in the US and PTT offices in about a dozen countries including Japan, Hong Kong, Australia and Switzer-

The tariff suggested by RCA for Intelpost, which it said did not differ greatly technologically from Q-fax, was 60 cents a page with a minimum volume requirement. The Q-fax rate is between \$6 and \$12 a page. RCA has made no comment on the FCC objec-

Meanwhile the Londonforonto satellite link is costing £4 for the first sheet plus £2 for subsequent sheets of the same message. Each A4 sheet takes about a minute to transmit. If the message is collected by express post it costs a further £2 and another £1 for optional special delivery in Toronto.

To give the service a starting boost there is a half price offer for the first three months. Door to door delivery takes from three

High speed Z8000

A HIGH-SPEED version of its Z8000 16-bit microprocessor has been announced by Zilog, and it 40-pin package addressing 64Kintends to extend the power of the chip further by adding linked specialised processors in the

seconds - and is offered in two at a number of add-on products

The Z8000 features an architecture which enables ad-The new version of the Z8000 ditional specialised processors runs at 6 MHz — 167 nanopackages, the Z8001A which has such as a fast Cobol processor 48 plns and can address up to and an array processor.

FOCUS

Motivation for DPMs

of both personnel and management is becoming an ever more important factor. Motivation Having received the motivation of the

is no room for such subtleties. The latest salary survey reveals of Bo Derek could well improve that in the land of The Big Apple, morale and hopefully producthe DPM is taking a substantial tivity. bits, the average DPM scalary in For the installation as a 1979 being \$27,000. The front whole, winning fame and presented the could reveal by work or to emigrate. If such a prospect does not turn on the average UK DPM, afternatives are not far

According to Ted Cluff of the Institute of Data Processing Management, a definitive motivation list for DPMs would include job satisfaction, bonuses, consultative manage

mant: working conditions, salary and prospects. Not all or us would agree with

IN a period when improved DP all DP men. For many it suggests productivity is high on every the prospect of the early introinstallation agenda, motivation duction of high-level computing

can take many forms ranging tion message, it is the turn of the from direct encouragement to DPM to encourage his team. Where cash is tight and hours pleading and cajoling thrown in are long, the introduction of a for good measure.

In the States, however, there room, a covered motor cycle is no room factors. room, a covered motorcycle shed in the car park or a poster of Bo Derek could well improve morale and hopefully produc-

runners in the US pay stakes are stige could possibly work public utilities and finance, wonders. Winning the Comwhich probably reflect similarly puterstars competition could be
in the UK. Obviously therefore, fust the thing. The running.
UK DPMs sacking past incent recent should appeal in particutives would be advised to either limit to the URM, who is noted for
or to emigrate. If such a prospect ging about in all directions. This
does not live on the average LK. event is not recommended for system analysts who specialise in running round in ever smaller circles.
The throwing event is very

muchfor the programming team who are capable of throwing the complete installation into total; confusion in their case, a contest featuring loops would be

mant; working conditions, test (eaturing loops would be salary and prospects."

Not all of us would agree with this selection and many would part will of course be the major be prepared to folerate grotty working conditions provided the looking conditions provided the looking conditions provided the looking conditions provided the looking training periods. Future applitude tests: could well include a dozen meanwhile, offers all things to hour's jogging.



An urgent document is fed into a scanning machine at the Royal Mail's intelpost Centre at the Stock Exchange Post Office in London. The

Rules say Cluff will

BY a constitutional quirk, the institute of Data Processing Management's full-time secretary general Ted Cluff will have to stand for election again at the institute's 1980 annual meeting. It is being held at the Bloomsbury Centre Hotel, Coram Street, WC1 on Thursday, July 17 at 9.30 am and, in addition to Cluff's position, the membership total currently extends at \$100.

Cluff's position, five members of the institute's ruling council stand down. Nominations for all posts in early 1982. Currently, about one third of all the applications pm.

The membership total currently stands at 6,800 and it is

one third of all the applications are either coming from or are Cluff, who signed a seven-year being sponsored by BCS contract with the institute will members.

IBM aims for more WP sales

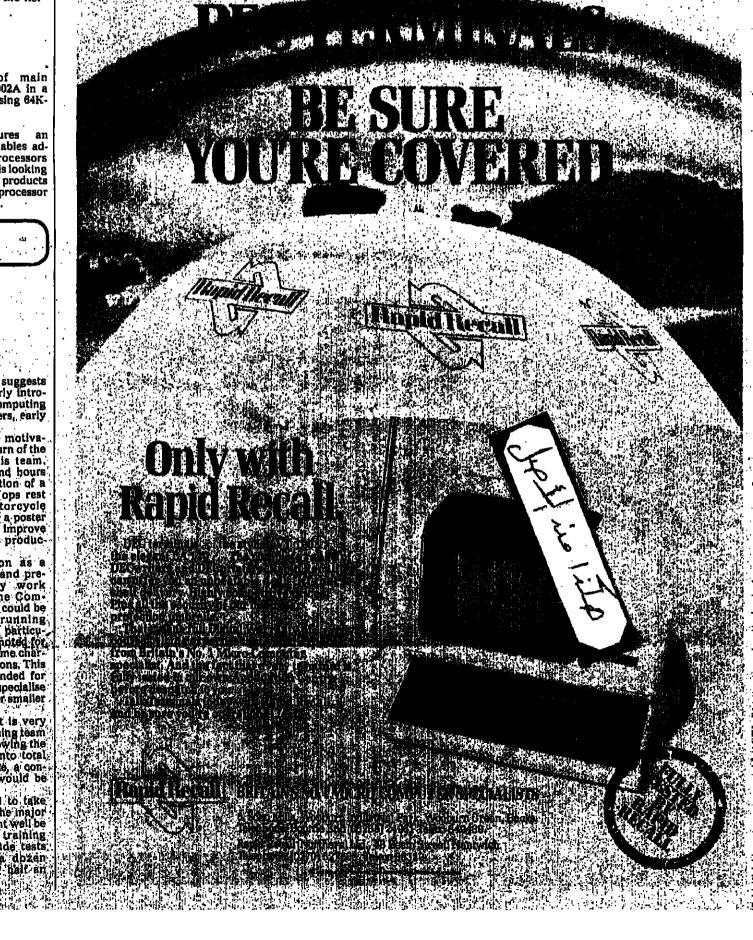
• From front page

over time support for facilities for filing and transmitting docu-ments between all the word processing products included in

It is forecast that by 1990 a substantial part of IBM's revenues will come from OEM (CW, June 12), and the company bps. The printer is a themal has take its first steps in this matrix printer running at up to direction with the European 40 chps.

launch of its 3101 Teletypecompatible display and the associated 3102 thermal printer.

The products are being sold in the UK through IBM's new direct marketing centre in Chis wick. The 3101 is an Ascil display with separate keyboard, attach able to IBM and other manufacipherals sold to all comers—at speeds between 110 and 9,600





by Claire Gooding

PAGE SIX

for programmers and analysts

Dispelling the myth of the 'backward North'

want in London, so they say, and indeed it does seem that, in order to look at most aspects of the any less fruitful.

String unterence in character and attitude, which does not, however, make business there any less fruitful. computer world, you don't have to stir very far from the metro-

As many companies have not only interesting but a building in Liverpool's Dale refreshing change to find one which is based in the heart of North-West England with the London office only a sub-

Ask anyhody what they think of Liverpool and they will probably say that it is dirty, grimy and wet but the people are marvellous. Marvellous people are few and far between und the notion that most of them are you travel North there is a training expertise it had culti-

KBS Computer Services is a 10-year-old private company which is just about to become a Street. Bowers of Kennedy, Bowers and Smith, the original KBS, is now the sole proprietor of the company which is engaged in running commercial and TOPS courses, contract work and a data prop bureau. It is also OEM dealer for the

Texas Instruments DS99010. The company first started running TOPS courses in 1975 when it was approached by the collected in Liverpool is a bit Manpower Services Commishard to swallow. However, if slon and asked to use the

pretty coloured ad.

and white.

Available from Dicoll, AED's new full colour graphics system is more than just a terminal. It's a complete high resolution colour marging rystem under microprocessor control with DMA interfaces available for most popular miotomputers.

Usually only available on much costier systems.
High speed DMA port.— new there is it is a.c.
Large retreat memory.
RS 232t interface as standard.
DMA interfaces to most minimum at a.c.

An IBM 4331 has recently been installed at the Liverpool limited company. Its head office office and the firm hopes to set their head offices in London, it is an impressive Victorian up a bureau there. KBS has offices in London, Coventry, Leeds and Birmingham. The Coventry office has an ICL 2903 and also runs a recruitment

The wide spectrum of activity covered by KBS does not impair its success in any one venture, but surprisingly the company

does not make a very big profit.
"Bowers, the proprietor, is not the sort of man to focus all his attention on money-making," explained Andy Feather, adver-

16.8 million colour shades

are impossible to show in a

Sohere are 256 in black

The students at Liverpool that we spoke to confirmed the fact that they are very well treated and are getting the most out of

Also, it was reassuring to see that on the day we visited KBS, a special open day was being held for representatives of the Manpower Services Commission and Job Centre workers.

We have written before on this page about complaints from prospective students and employers that Job Centres do not have adequate information to give to those who wish to pursue a career in computing. On this particular day in Liverpool, people from the MSC were treated to a film show and introduction to computers, an ex-for KBS. "Most of the money we planation of KBS TOPS courses,



TOPS students at work on the North Star Horizon microcom

selection procedure and methods of training and were then given the aptitude tests selves to attempt.

This part of the open day caused not only great hilarity as those present realised their un-suitability to the job of a programmer, but great insight into the sort of people who could find

The attitude and application of KBS TOPS students was mpressive. In recent examinations of TOPS courses we have always found an odd and interesting mixture of backgrounds, and Liverpool proved

A barman, a croupier, a used car salesman, a teacher and an electrician were among the ones we interviewed, and even a former trainee priest has passed through the doors of KBS to

programming success.

Both the ex-croupler and the ex-salesman said that they had to take considerable cuts in salary to go on the course, and that their starting salary on starting work would also be a great deal less than they were coming out with before. They also sald that they had to put in quite a few hours, working most nights until nine or later, coming in at weekends and generally losing out on social life.

But there were no complaints "You don't get many chances in life," said one student. ominously. "We're very lucky to get this one and if we mess it up we don't get another."

KBS TOPS students are carefully selected not only on he grounds of their success in the aptitude tests but on their general employability. As one MSC official pointed out,
"There's a world of difference between training and placing."
One student had a job waiting

for him on completion of his training, in Norfolk, where he was moving with his wire of only a few weeks. Students can state the areas in which they would prefer to live and work and the placement department, which arranges interviews and jobs anationwide free to add a state of the control nationwide, fries to adhere to

Assembler on its programmy courses, but as the courses at arranged so that people in trained in the correct ratio is vacancies, most do Cobol.

The students had all enjoyed the course and although not confident of complete success were sure that they would start before the end of course if students had jobs to go to - and 1 be useful from day one. Out student said that he thought the training and depth of knowledge he had acquired was equivalent to 18 months' commercial ex-

No-one is going to sugget that all firms in the North-Wat operate in the same way as KB in similar headquarters or w the same altruistic plinciple Neither could they say ha companies in the area are less successful, less business-like or in any way behind those in the

However, myths still do about the "backward" North and it is encouraging to find a firm of the size and diversity of KBS which is rapidly turning of highly qualified local people in out the country.

Puzzler

AS part of his homework recently, my youngest son his to work out 1878. The snipper ran to eleven digits, and wist with his trying to squeate it a on to the same line of his sta clee book, the jest figure com-out so small that I couldn't rea So his (correct) solution tooked something like this

95 388,992

The AED 512 Colour Graphics from Dicoll.



E a TREND a QUME a DIABLO . LEAR SIEGLER . TALLY . PERICOM . TECHTRAN

SOFTWARE FILE

Green light for Ada production compiler

THE multi-million dollar contract for the first Ada compiler has gone to Softech of Massachusetts. The US Army communications research and development command. Caradcom, of New Jersey, has commissioned the company to build the first production compiler for the long-awaited high level language under the management of Dr Larry

Honeywell, which teamed up with Softech in writing the winning proposal, is to assist in the

compiler design and building as

a subcontractor. Honeywell's

French associate, CII-

implementation of computer-

based systems for government

the Ada revolution are being

which three otherwise rival

companies have pooled their

Software Sciences, and Systems

Designers have formed a single

team of Ada expertise so that the

UK may keep abreast of the vast market shortly to be generated

by Ada. The consortium's main

concern is that the UK should

have tools based on the home

market to complete against US

A consortium spokesman

welcomed the compiler contract

as a sign that Ada is alive and

kicking. "It reinforces our view that the prospects for Ada are

good. But it is likely that the

coming US Air Force compiler

will be best as a possible future standard and it is unfortunate

that the US Army has chosen to

and European products.

Representatives from SPL,

made by the Ada consortium, i

In the UK, preparations for

commerce and industry.

sultants on the language.

puter AN/GYK 12.

APL meeting

iverson is to speak with Gene McDonnel on "Teaching and APL" at an open meeting at the Cafe Royal, Regent Street, London, on Tuesday, July 1. It opens at 5.30 for 6.00 pm and admission is free.

User group

A USER group for the MVT/ Famos operating system has been formed by Equinox Computer Systems of London. MVI/Famos is a multi-tasking. multi-user disc operating system which runs on most 8080 and Z80 microsystems.

Equinox has also announced that CAP's MicroCobol is now available on the Equinox microcomputer system, including the range of applications such as AutoClerk and AutoIndex.

Marketing deal

THE online programming sys-tem Acep, previously sold by Itel under the name Prepso, is to be marketed and supported by Software Module Marketing of Sacramento, California.

Acep interfaces directly with CICS/VS, and also with remote BTAM, TCAM and VTAM as well as local 3270s. IBM's VSI and MVS operating systems are also supported,

Pacs goes online

PACTEL has announced an integrated online version of Pacs, the inventory and control sys-tem, to run on ICL ME29/2903

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International standard

MEMBERS of the Ada_consor-Honeywell Bull, will act as con-The Ada language is considered the next generation standard language for Department of Defence activities, and the contract is a milestone in its evolution. It will result in a compiler hosted on the Digital Equipment Vax 11/70 and PDP 11/70, and the US military com-Softech specialises in the definition, analysis, design and

tlum — SPL, Software Sciences and SDL — believe that Ada technology will be the key to the US Version defence and industrial systems markets of the future and, with the backing of the Pentagon, it is likely to become the standard real time language for defence from the mid 1980s. Whereas Coral was a UK standard, Ada is

100 firms at first Euro show

WHAT is claimed to be the tirst European show to be devoted entirely to software is to be held in Paris next May. Run by a UK company, Executive Conference Organisers, it will be a three-day event in English and French and will include an exhibition. About 100 firms are exhibition. About 1 00 firms are expected to take part. The plan is to provide each

exhibitor with a terminal with access to remote machines in order to demonstrate products. Details from Robert Joseph, Acorn Studios, 9A Byfeld Gar-dens, Barnes, London, SW13 9HP. Tel: 01-748 0287.

AN OS version of the job accounting and billing system from Computer Associates, CA-Jasper, has been released. It provides the report generator Wizard as part of its facilities and is compatible with the DOS version. It costs £5,500 from CA n Maidenhead, Berks.

Two challenge 2900 transaction market

dent of ICI, are likely to liven up the ICI. 2900 transaction processing market. A newly-formed consultancy offering a complete transaction processing service for 2900s has arrived on the scene at the same time as Vecoms-TP2900, an online applications control system for 2900s running under VME/H, from Gresham Computer Ser-

Consultancy Terney, Edge and Morffew (Team) is said to have broad experience in the development of 2900 software, TP services and VME enhancement. Its services include TP design and implementation, project management and transi-tion to 2000 TP under VME, and advice on sixing and performance as well as answering day-by-day problems.

Gresham's aim with the Vecoms-TP2900 was to build on the TP skeleton provided by ICL

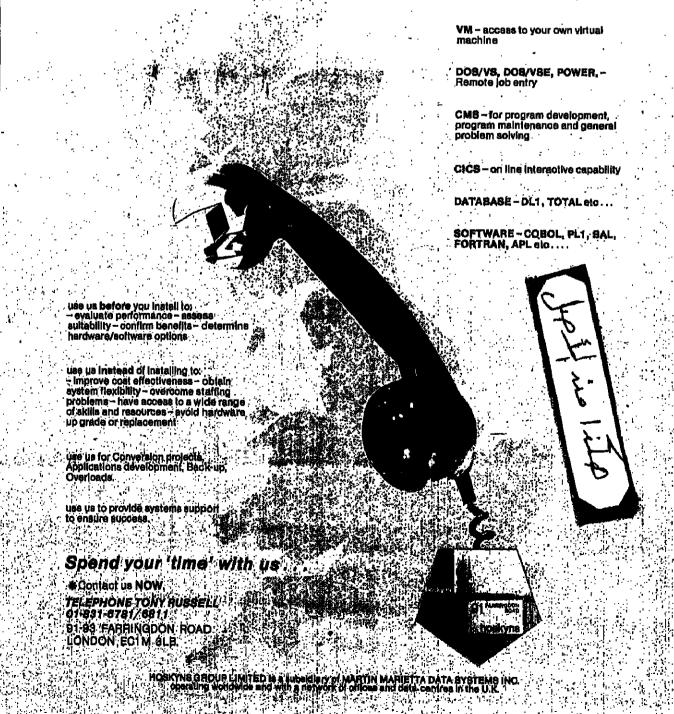
ment for the implementation of TP on the 2900, as well as pro-Viding a simple method of transition to ICL native mode of operation for users of other TP

The areas where Gresham has concentrated effort in improving on ICL's standard teleprocessing option, TPO, and teleprocessing message systems TPMS are privacy control, message handling, security application control, and the provision of online performance

The system, which was developed using Cobol in 13 manyears, boasts un average response time of two seconds or nine terminals. It was developed with ICL's approval, and is already running at one site. Vecoms-TP2900 costs £18,000

with £150 a year maintenance after the first year. A VME/K version is planned.

hoskyns 4341services for the IBM user — batch and on-line—



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practical quidance they'll scon be up to the high standards set by Dataskil

your stall properly and here you can draw on our experience in the job market to find the right

in technology, but resorts to and must therefore be supplepenny-pinching where operator training is concerned.

OP SPOT

software is snapped up almost regardless of cost, much to the delight of management and development staff alike.

But the operators — the people responsible for the equipment, day in, day out — often receive very little in the way of formal training. They're expected to acquire their skills as they go along. Odd sense of

internal, hands-on training -- it enables staff to learn the practi-

to spend large sums on the latest such training is rather limited mented by formal courses.

The latest in hardware and BOC Datasolve's operator training centre in Old Park Lane est people think that Op Spot

solve, let's look at a few other companies and the operator training courses they provide.

It was for this reason that

was featured on this page some weeks ago (Op Spot, April 17). is biased in favour of BOC Data-

operating systems, DOS, DOS/ VS, DOS/VSE, data control techniques and telecommunicacourse is IBM-blased and is intended primarily for sites which are about to implement a teleprocessing system.

The company also runs an advanced teleprocessing course ntended for experienced operators and TP controllers. Both

architecture, the IBM OS operating systems, DOS and DOS/VS. A DOS/VSE course

will be available soon. and management courses you're after, why not try Hoskyns Education, who are based at 91 93 Farringdon Road in London. Tel: 01-242 1951.



|Can you take TOPS students?|

HOW abot taking a TOPS operations student for two weeks' practical training at your installation? Borehamwood College is looking to place such students from July 7.

This part of the TOPS operations course provides an excellent opportunity for installations looking to recruit operations staff at the junior level.

The students hope to find sites

The students hope to find sites

Towns their respective hems towns. They hall from the fellowing areas: Stevenage (2), st Albans, Norwich, Hove, Luta, (2), Wood Green, Norwich, (3), Wood Green, Norwich, (3),

near their respective home towns. They half from the fel-lowing areas: Stevenage (2), St. Albans, Norwich, Hova, Luta, (2), Wood Green, Northants, Westford Michael

PHILIPS

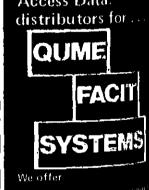
Manual v automatic scheduling for the

caused by the user. A good scheduling system enables the DCOM to compare planned events with actual events and niprove job flow.'

Regarding equipment underutilisation, he comments: "Scheduling cannot completely overcome the effects of a poorly configured system or improve poor operator performance. However, an effective scheduling system can help the DCOM deal more effectively with these problems by enabling him to identify the real cause of

The author points out that proper scheduling can improve the utilisation of any critical resource and touches upon the ollowing areas:

Input control. Late input almost always affects the schedule. The input clerk should know not only when the input is to arrive, but also when it is due.



On site warranty. "Rapid call-out on brea

ignore it. Hope it will go away Tell yourself your Shift Leader lan't really looking Tell yourself your Shift Leader lan't really looking That your Data Prep Supervisor's holiday is still

months away.

If you're very, very lucky, you'll get away with it.
But if you're not prepared to trust to luck the
sensible thing to do is talk to Khight Computer Services.

We'll help you through a temporary sticky patch
by offering you the pick of our temporary sticky patch
by offering you the pick of our temporary staff, from
data prep people to operators and programmers.

Or our consultants will help you find a permanent
solution to what you thought was going to be a
permanent staff problem.

Whatever your problem is, we'll bring our left
years of experience, and the strength of the BOC Group
to crack it.

Before it cracks you.

Refore it cracks you. Phone us for a no-commitment discussion of how

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entry plus * word processing. All this, with

update * batch communication * remote job

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the P7000 will run * data entry * local file

computer function; but you don't need more

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Announcing the Philips multi-function P7000. The one that gets it all together. What can this mean to you?

Simply years ahead

Bottom-line savings because you need fewer stations; single-function stations no longer sit idle users cease to struggle to cross train onglissimilar equipment; less equipment means lower maintenance costs, less management *transaction processing *batch office space.

> Optimum flexibility because: computer resources keep up with changing demands-hour to hour, shift to shift, month to month; one minute word processing-the next, taking orders and printing out invoices.

Planned growth because additional terminals, memory extension modules and peripherals can be added step by step.

What's more, the P7000 is installed arid

proven in over 30 UK sites. This is just one of. a dynamic range oromice machines—and a part of the wider Philips Business Systems' contribution to a whole new world of business knowledge.

Lwould like to know proje nhout the P7000. Please contactine I would also like information on the full tange of Phillips Address To Mr. Tony Smith! Philips Data Systems (Distributed Processing Group), 1 Bell Street, Maidenhead, Perks St. 6 IBU: Tel: Maidenhead (0628) 39131.



the tiny lotter R on the cuff, and the man is Nost Atkins, who is also a ileutenant-commander in the Royal Naval Reserve. Atkins received the Royal Navy's Reserve Decoration from Rear-Admiral Williams, Flag Officer Medway. The Decoration is presented for long service and good conduct; Aikins has been a serving Reserve officer for 14 years.

Selling Scotland in Silicon Valley

THE City of Glasgow is to be promoted in the US by a newly-appointed Business Development Executive. Edward Brodle. His brief is to sell Glasgow as a trade and investment companies. nvestment centre to companies seeking to expand their operations

or link up with Scottish companies.
Brodie will be based in California for one year, during which he will make contacts in the business com-

make contacts in the business community, promote Glasgow and the West of Scotland as a base for industrial expansion and identify outlets for Scotlish products and know-how in the US.

Later, he may move on to other parts of the US, Japan or Europe.

Brodie is also deputy chairnian of insight Rusiness Systems and managing director of the Black and Edgington Group's computer division.

Kevin Kelly has been appointed general manager of Pensions and Insurance Computer Services, the division of UCSL in which he was a partner before its acquisition by UCSL in 1978.

Kon Mace has become salés manager computer systems with ITT, and Peter Herbour is product sales manager, viewdata systems.



director of international operations with Auerbach Publishers. Until recently he was a publisher with

Brian Arnott has joined Century Data Systems Inc in the newly created position of director of European marketing. He will be based in Bracknell, Berks.

deadline approaches A £500 PRIZE is awarded annually Biancy for his work on the applica-tion of the Josephson Junction is research into high frequency microfor a practical contribution to the advancement of electrical or electronic science or engineering. It is the Karl Heinrich Gyr and Heinrich Landis Commemorative Prize, and is administered by the Council of the IEE on behalf of the donors, Landis and Gyr Ltd.

wave and laser systems.

The deadline for applications anext week, June 30, Forms and further information about the award can be had from the Secretary. The and Gyr Ltd.
The prize went last year to Dr T. G.

Institution of Electrical Engineer
Savoy Place, London WC2R 08L.

NRDC chief

DR JAMES CAIN has been

Sir Vincent de Ferranti

SIR Vincent de Ferranti has died at the age of 87. He became chairme and managing director of Ferranti Ltd in 1930 after the death of his father. The atmosphere which was created under his leadership we

it was owing to his encouragement that Perranti's plonsering we on the digital computer was undertaken, in collaboration with Mack ester University.

Sir Vincent remained as managing director of Ferranti until 1988 and as chairman until his retirement in 1963.

Engineering prize

very favourable to research and lot to the company's major co

DR JAMES CAIN has been appointed managing director of the National Research Devolopment Corp, succeeding W. Makinson, who retired at the end of May.

Dr Cain has a PhD in chemistry and worked as a research biochemist before joining NRDC in 1955. He has been chief executive of NRDC's department of applied science since 1971, and a member of the corporation since 1973.



PLESSEY Semiconductors has a new managing director. Douglas Dunn, who has joined Plessey from Motorola UK, where he was deputy general manager of the East Kilbride

Dunn will be based at Swindon, Wilts and will report to Melvyn Larkin, managing director of the solid state division.

Chairman of CEI

CHAIRMAN of the Council of Engineering Institutions for 1980/81 is Dr Percy Allaway, chairman of EMI Electronics and a past president of

Elected vice-chairman is Bryan Hildrew, managing director of Lloyd's Register and senior vice-president of the Institution of Mechanical Engineers.

Jim O'Hagan has been appointed director and general manager of Datacall, and David Sheppard has been promoted to bureau manager, with the responsibility of marketing technical packages for the engineering and chemical industries.

James Stark has been appointed a director of Y-Ard, the engineering consultants. His previous appointment was that of manager responsible for control systems, simulation and microprocessor applications.

Manfred Omenzetter, praylously
European distributor manager of
Rockwell's electronic devices division in Munich, has become sales
manager for Central and Southern
Europe with the division. Leonard
Sim has joined the division, as sales
manager, from Ferranti Samiconductor.

DIARY

JUNE 24-27 Meeting IBM CUA operations group Intern Hotel, Bristol,

Floating point systems users' group AGM. University of Surrey, Guildford, 9.30. Details: David Bish, 0488 71281 and 470. Integer programming approach to crow scheduling BCS Mathematical Programming Study Group London School of School of School London 5.30

Sconomics, London, 8.50.

7ULY 3

1BM Guide SET group meeting. 1BM Basinghall Street, London EC 2 Details.

Alan Peck, 01:838 2104

1ULY 3:8

Lawyses in the Fightes, conference and exhibition. EA 4488



Milke Greenwood has joined bits Logic as training and development manager. Previously he was training manager for Spillers-French Milling. Chris Scott, previously rack and stack manager with Cossor, joint Data Logic as Southern region

Stewart Smith has joined CAP Scientific us manager of the G





MY GP ALREADY

LIAGNOSIS, WORK

BANK ACCOUNT

PRESCRIPTION CHARLES



NASHUA Nastitia Computer Products, Cory, House, Bracknell, Berks, RGIZ IET Tel: 0344 52711

When up to eight different Invers of active circuit lines as narrow as six thousand the of an inch are contained in one printed circuit board the holes that vertically connect the layers must be positioned with great accuracy. To achieve this level of precision ICL Logiclayer uses program-controlled automatic drilling machines from the US firm Excellon of Torrance, California, which was considered to offer the most suitable equipment for the job. The Excellon machine in our picture (right) is one of six at the Plymouth Grove factory which together are capable of drilling several

System X a target market for Logiclayer

exchanges for System X could provide a lot of business for the multi-layer printed circuit board manufacturing and marketing operation, ICL Logiclayer, that was formally launched by ICL last week (CW, June 19).

Logiclayer personnel have already had talks with the Post Office about the suitability of using its multi-layer boards in System X exchanges in the future. It appears that multi-layer

Jones

technology satisfies the System X requirements for high They belong to competitors like reliability and fast repairability Marconi, Ferranti, Siemens and Logiciayer points out that its CII-Honeywell Bull, output of multi-layer boards is a But Logiciayer is confident

several markets being targetedby Logiclayer. Avionics and

are two other big potential outlets, and Logiclayer emphasises that it is also prepared to sell boards to ICL's competitors in the computer business.
But while it claims world

leadership in multi-layer fine line PC board, technology, Logiclayer does not appear to be: geared up yet on the marketing side to make a filling dutside Europe. In the US Logiclayer depends on ICL's small force of

two-thirds of its projected £5 million worth of business out-side ICL in 1982 still to come from the UK even though by 1984, according to figures quoted by Logiclayer itself, the multi-layer board market in Europe alone will have grown to nearly £150 million.

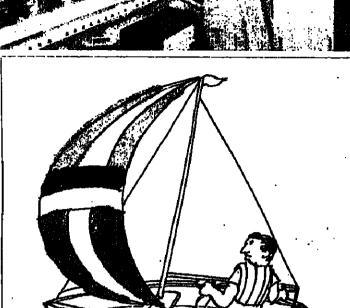
III EE JOYNAK IV

Logiclayer's plan is to expand production by 20% a year over the next five years, and no more than about 25% of output during that period will go to outside customers. This growth can be achieved with the existing plant and machinery at the two existing and virtually identical fine line multi-layer manufacturing facilities at Plymouth Grove, Manchester, and Kidsgrove, Staffs. According to Logiciayer there are about ozen other factories around Europe manufacturing multilayer boards at the moment

lot higher than any of the three that the service it can provide contract to build System X ex-changes GEC, Plessey, STC.

Telecommunications is one of several markets and suppose the service it can provide compares favourably with any compatitor. The company points out that its highly productive several markets and suppose the service in the service it can provide compares favourably with any company points. out that its highly productive equipment will reduce the time for getting a customer's custom designed board into production from nine months to three months and that the wait can be

ss little as six weeks using a special quick turnround facility. Logiciayer claims to be the only PC board manufacturer that can produce boards with as many as 22 layers in large volumes while achieving economically high yield rates. The average proportion of boards that have to be totally Europe. In the US Logiciayer depends on ICL's small force of About 150 boards with 22 layers computer salesmen to make in itial contacts with prospects in the slectronics industry and tilere is no marketing set-up at all in Japan — a market with enormous potential Logiciayer recognises the potential of supporting 30 daughterboards each with a fotal of six or eight layers and nearly 150 integrated circuits. The state of the s



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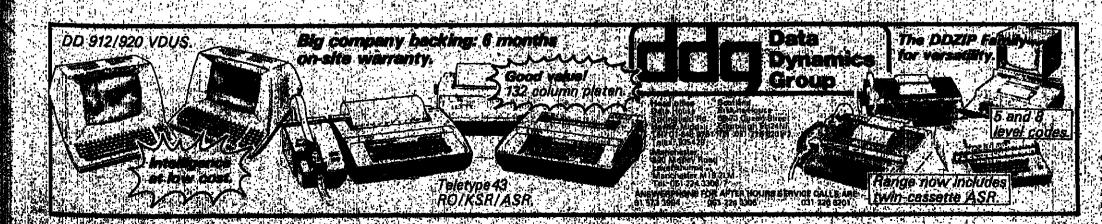
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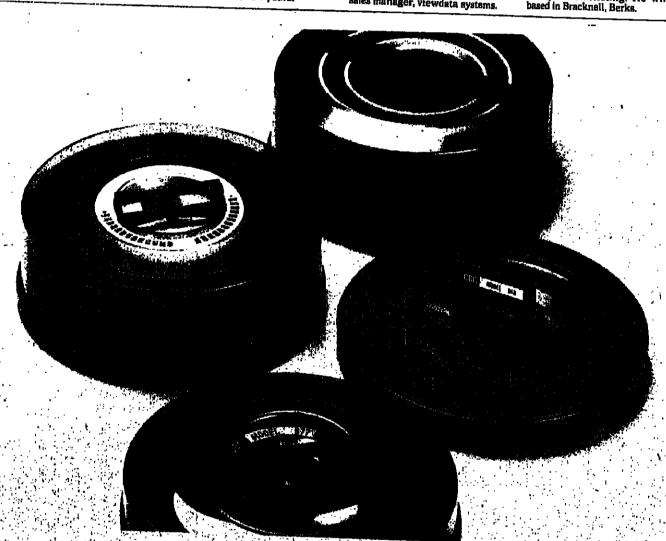
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Sall Centrolibe asset on bade 3369, ideay, but whe to Control Deland, Inflied P.C. Fox 16, Argyle Way?

CONTROL DATASÈT Coatrol Data



more than £500,000 in each of ts two computer-controlled plating lines at Plymouth Grove, Manchester, and Kids-grove, Staffs. Shown here is part of the section of the line at Plymouth Grove used to electroplate copper and tin-lead on to the circuit patterns on the outside surfaces of the multilayer boards, it also plates the sides of the holes that vertically connect the different

tern has been etched out of each copper layer using a photo-chemical process based on a photographic master of

ORDERNOW **NEW** FROM NASHUA

Vashus 4464 (CLIEDSRO Amballote) 80 megabytes Storage module specially formatized for ICL EDS 80's

by Eileen Stainer

MICRO NEWS

Apple to use Eire as launch-pad

enforced absence. US computer company Apple has made two decisive moves that could make its position in the personal computer market equal to that of intel in the microelectronics

Firstly, it has moved its concentration with Apple II from the education market directly to the business market with the new Apple III.

Secondly, Apple is moving in a big way into Europe, with a plant at Cork, Elre, and a mopean marketing operation

Apple III is aimed directly at the \$3-10,000 business computer market which, according to Dataquest, is growing much faster than the home computer market and is expected to reach \$700 million by the end of 1981.

main configurations, an infor-mation analyst and a word pro-cessor. Both can be Apple II look-alikes and directly run Apple II software.

tion analyst package comprises an Apple III incorporating 96K-bytes of RAM, a built-in 54 inch lioppy disc drive, which controls up to three additional discs, a 73 key keyboard with a 13 key numeric keypad, two built-in printer interfaces and a 12in black and white video monitor (a colour monitor or TV set is

Optional). The software includes Apple's SOS (sophisticated operating system) which supports Pascal, Basic, Fortran and Pilot (educational language) and tools such as Visicale III, Mail List Manager and Apple Busi-

with some of the foremost authorities in this field.

"IBM will eventually evolve into a 'gigantic service'

bureau' (Charles Lecht in the keynote address at

"At Future Systems Forum in Scottsdale, Fertig.

Future Systems Forum," Computerworld

unveiled the most detailed projections yet

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the selection of quotations below indicate:

For about £2,500 the informa-

As a word processor, Apple III comes with an external floppy disc drive as well as the built-in one to provide the capacity to store about 60 pages of text per floppy disc and costs about £4,000.

The Silentype thermal printer, or a letter quality daisy-wheel printer can be used. Software includes SOS and word processing applications software, and training is provided.

Like its predecessor, Apple III uses Mos Technology's 6502 processor, but in a later form. The 2MHz 6502A is twice as fast, has additional instructions and is capable of addressing 128K-bytes of memory. A 6-bit D/A converter is also built-in for use in voice and music synthesis. Apple is currently doing R&D in

Microsense boosts its dealer network

AS PART of a plan to expand the will be boosting its number from 200 to shout 300.

But any new deplots must come up to a higher standard of support if they wish to gain Microsense's authority. Users will be able to obtain the

apport service by paying an an-ual charge of £106 for an Apple i system. A similar scheme is mvisaged for Apple ill users. For this fee, each dealer will aupply a spare parts service for the user and return faulty parts to Microsense for repair.

Apple will be sending an Apple III to each dealer in July and volume deliveries are expected in August in the US and in October in Europe. It is likely that dealerships to office equipment suppliers will be granted and ITT, which produces Apple II under licence as the 2020, will not be given a licence for Apple III.

given a licence for Apple III. • Mike Brewer, managing director of Microsense, is plan-ning to move sister firm Date fficiency into an 18,000 sq ft uilding. The old one at Hemel empatead will be used as an Apple !!! store and for work-

1,400 more jobs for Irish

APPLE hopes to make a big impact in Europe and take 30% to 40% of the market. Initial plans are to occupy a 43,000 sq ft manufacturing. plant at Cork, and, at the same time, to set up a distribution and support facility in Zelst, Holland. The factory should be running by September, firstly to assemble Apple IIs and then to manufacture both Apple systems and their respective peripherals.

This means 65 new jobs in Eire y winter, with about 1,400 by 1985, when the manufacturing area will have expanded to

US personal market shares

ACCORDING to a Dataquest survey, Apple has about 24% of the personal computer market in the US. Tandy has about 48% while the Commodore Pet has

Although Tandy is top in terms of numbers, Apple claims to be top in terms of value of systems. However, in the UK. ils is almost reversed: Commodore claims to be top with about 50% of the UK personal market.

Make your Pet sing

A' COMBINED hardware/ oftware package which is said o "make your Pet sing" is being offered by IJJ Design of Maribo-rough, Wilts. It is manufactured by Micro Technology Unlimited in the US.

istance problems. A company that has design and fabricated a circuit can the facility to investigate in thermal profile and to deted certain characteristics, such # maximum temperature over period in different condition i reliability figure can be obtained with the results. The department has offers

similar service for some ties. primarily to investigate w market and the need for the # . *! vice. Most of the work was door be interested in the service to be GEC, Smiths Industries, T

Full size screen version of Pet is launched

the Pet (CW, January 3) was launched at the Hanover Fair in April, It has 18K-bytes of firm-

Ware and 32K-bytes of firm-ware and 32K-bytes of user RAM, and is designed for both word and data processing. Two floppy disc drives are available with the system, called CBM 8001. The first is a double-density, single sided disc with a

capacity of 1.5 megabytes calls CBM 8061, and the other is double-sided with a capacity of megabytes, called CBM 806 Both are IBM compatible.

A system comprising the 806 CPU (based on Mos Technology's 6502 processor) an electronic typewriter and floopy distribute costs DM15,000 (A) with the costs DM15,000 (A This is also available with word process



with word protes aing software as alternative lysis alternative lysis comprising the CPI a printer and hope of the system is advantageous for tures such as a proof our screen; and compression and performers as a proof performers as a proof our screen; and compressions performers as a proof our screen; and compressions performers as a proof our screen; and compressions performers as a proof of the screen and compressions are program and compressions are program and compressions are program on a program and compressions are program of the compressions are program of the

Brum helps with IC and device problems

THE electrical and electronic engineering department of Birmingham University is to se up a service for industrial, conmercial and government organ isations to look at thermal problems in integrated circuits and specialist discrete devices such as microwave and VMOS pope

oup concerned with this area:

Dr P. W. Webb and Prof. G. I.

Wright, see a major problem

emerging soon in microelectronics fabrication. They define

it as the placing of driving de

vices, such as power circuls which get hot, in close proximity

to, but not necessarily on the

same chip as, MSI, LSI and VIS

As the trend for more des

circultry continues, so arises lit need for tight-packing of device

with different thermal properties. This in turn create

reliability and temperature as

puter business, which is totally With a Wolfson Foundation award of £110,000, the depth i dependent on the microprocessor, has succeeded in growing at ment is planning to buy a new set of thermal imaging equipment to attain resolutions of its a similar rate to the change in technology. Now the stage has been reached where it is no to 15 microns in its temperature longer feasible to class the microcomputer as one segment of the computer industry. now it has been using equipment which can provide resolutions It has expanded so much that 30 to 50 microns. Two members of the research!

it can quite easily be split four ways within itself. The story is not complete, however, as gaps have been left in the marketplace during the expansion. Various support businesses have not been followed up at the same pace, and consequently the market is grossly under-served. Jim Myson, formerly of Digital Equipment's field service

logy is changing so fast that it is almost impossible to define it at

any one point in time. In turn.

the application areas of LSI and

VLSI devices are striving to

keep up with the phenomenal

One such area, the microcom-

marketing department, has recognised this, and set about With the backing of Midlec-

MYSON ... the consequence of

tem Services which is aiming to

provide a hardware mainte-

Myson considers it necessary

lure to a small user in terms of

thuslasts and hobbyists in education and increasingly in small business, personal computers are high volume business.
Systems like Cromemco and Horizon, Myson defines as midrange. They cost between £1,500 and £7,500, have a better physical construction than the personal computers, possess multi-user facilities and can be used with larger discs. They are lso available with reasonable

Software for the mid-range systems comes in a variety of languages such as Cobol, Basic, Pascal and Fortran, but again minimal support is offered.

A fair range of packages are available to the user. The sales area exists for vertical markets, dedicated applications and commercial systems, and is primarily,

tron, the Derbyshire-based ter-minal and DEC-based microsys-tem supplier, he has formed a subsidiary called Terminal Sys-Included in the top end of the market are the Hewlett-Packard range of microcomputers, the DEC LSI-11 and Data General's nance service for various types of microcomputers (CW, June Micronova, which cost between £2,000 and £15,000. These systems have full multi-tasking facilities and, unlike the other to split the microcomputer seg-ment of the industry into four three categories, can be

upgraded. Software is proven and comes separate categories, the boundaries of which will conin complete ranges of program languages with communication software available. Both harde tinually change to incorporate changes in technology. These categories comprise a ware and software are fully sup-top end, a mid-range, a bottom ported. Myson recognises this which all reflect their own characteristic tendencies in the which all reflect their own cha-acteristic tendencies in the With the microcomputer narketplace manufactures easier to decide what sort of

Software support for Sinclair

SOFTWARE to support Siscials's five heat pelling portable personal examination of those recently evaluable from ACT Persons in immobiled, which include New August. At the same time this St. bury Laboratories. New Etain system upgrade will be released range, the Abort Atom and the ACT also plans to support the new Atom systems.

Discount for Polytechnic

KINGSTON Polytechnic has be repaired for a basic annual obtained a discount main-thange of \$40 plus VAT, while tenance service from Terminal the Televideo charge will be System Services in Belper to dropped from \$20 per unit to \$30 per unit. The Tricall service means that when three units go minals and micro equipment down they will be collected Each Pet and Apple unit will, and repaired by \$35.

rapidly expanding market

Maintenance service for a

the components sector creates a

series of vertical markets and

dedicated applications. The

dore UK and Microsense, the

sole UK Apple distributor, are

demanding higher standards of

customer support from their

The personals are low cost,

bordering around the £2,500

mark at present, but all are

relatively new with, according

to Myson, an unproven reliability record. No multi-

tasking is possible and each sys-

tem is only as good as its opera-

plenty of low cost, poor reliability programs available and these are usually in Basic. Little support is offered by

dealers and software houses.

Appealing to computer en-

On the software side, there are

dealers than ever before.

business has to cope with high ware and software can only be engineering costs on the hardsupported by the manufacturing ware side and high software or supplying company. For example, if a program error is Moving up market a little into detected when running a prothe bottom end, Apple, Pel, gram from ROM, the user has Tandy and Superbrain personal but one option — to return the computers begin to emerge Myson stresses that the picalong with Nascom component boards and kits. Myson recognises that these systems have a restricted level of hardware support, although both Commo-

ture is very different with regard to the high volume business of personal computers at the hottom end of the market, which is ported. He has developed a medium and high customer expectations.

At the component level of the market, service needs for hard- type of service is charged at a percentage of the system value per annum, which can be anywhere between 5% and 30%. However, this is not really a costeffective solution for personal

make more economic sense. For a medium level of customer expectation a one and two day response is required. Lower still, the systems can be taken to a maintenance depot for repair certainly inadequately sup- and then returned. Myson will be concentrating on this type of three-tier service to satisfy low, service for personal computer

computer users and Myson ad-

vises that a spare system would

Mid-range systems, being a High customer expectation calls for a speedy on-site service, serviced by dedicated support Many applications areas are being created by the growth in technology, but not all their support markets have been pursued. This is particularly the case in the personal computer business where the market for maintenance is

greatly under-served.

Micro News Editor Eileen Stainer talked to former
Micro News Editor Eileen Stainer talked to former DEC field service manager Jim Myson who has recently been made managing director of Terminal System Services, set up to provide hardware maintenance for various types of microcomputers.

Myson explains his philosophy, how he hopes to run TSS, and the support he will be getting from its parent, Midlectron, which is based at Belper, Derbyshire.

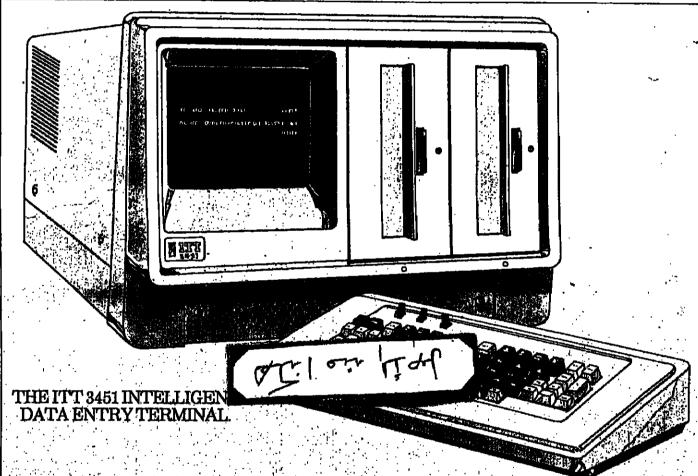
organisations and, according to goes wrong. Myson is planning Myson, require no further sup-

At the top end of the market, an area aiready well supported, exists high volume business, which calls for the three tier vices is offering a four hour or less service response time for high volume quantities, including Midtectron's distribution of DEC-based systems, and

range of terminals for this area. So Myson opted for TSS to support the top and bottom ends of the market with the three tier system. For £25 plus parts and VAT the user can obtain the "return to workshop" facility offered by TSS for each unit that to set up a network of service bases throughout the UK to control this For 15% of the system valued

at the high end the user can obtain the on-site service, which will be backed up by an already established Midlectron transport system that covers the UK.

Myson's policy originates from the fact that to a small system user the consequence of hardware failure in terms of be greater than that of a mainframe failure to a large industry. It necessitates the microcom puter purchaser realising service



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information. We think you'll be more than ! III Business Systems 1.1.



Future Systems Forum in Phoenix received exceptional coverage in the computer

"(Weil) contended the way to do it is to raise

either very right or very wrong, and he is more often right". **Electronics**

they'll do it again-and again." Electronic News

*A major IBM Competitor noted that Bob Fertig is

TELEX SOUNDS TO

ECR WORE INFORMATION

HOH

prices especially mase and rental-4 believe

Research lab set up £1 billion sales by 1990 by Westinghouse

establishing what will be the pected to come to several milbiggest and, it says, the best equipped robotics laboratory in the US. The company, which had sales over \$7 billion in laboratories save? 1979, has been using industrial robots in its factories for about three years. It plans to install several hundred new robots on ts assembly lines by the end of

According to Tony Massaro, the lab's new division manager, Westinghouse will use the lab for three different applications: testing robots against their manufacturers' own specifications; testing the robots' usefulness, and debugging them; and devising new

The lab is now being set up at the company's research and velopment centre in a suburb of Pittsburg, Pennsylvania.

WESTINGHOUSE Electric is funding research there, is ex-

But how much will the use of robots in Westinghouse's

"You can't generalise about savings," unswers Massaro. "In some cases, there are no dollar savings. But you have a more consistent product. And you can eliminate potential worker health hazards."

He explains that many companies have a difficult time complying with State and federal worker safety regulations. Most dangerous jobs are heavily regulated, protecting the health of the worker. But robots, Massaro says, need no such protection. "When a robot loses a finger," he ex-plains, "it's no big deal."

Like most companies that Sixty per cent of the equipment use industrial robots, Weshas already been installed, and tinghouse does not make Westinghouse officials say the robots. Instead, it buys them lab should be ready to roll by the end of this year. The cost of building the lab, as well as imation, ASEA and DeVilbiss.

terparts in several other industrial countries, US companies at present use few robots. Japanese manufacturers, for example, use some 35,000 robots, ten times more than do their US counter-

Nonetheless, the US market tributors sold some \$60 million worth of their machines in the US - a 105% increase over their 1976 sales, which totalled less than \$30 million.

This growth rate is likely to continue, and some industry experts predict annual robot sales in the US exceeding \$1 billion by the end of the 1980s.

The largest single group of robot users in the US is the automotive industry. General Motors, a pioneer in the field of industrial robots, has about 225 of the machines; Ford has some 250 mechanical arms, and Chrysler uses about 200 robots.

been good. Experts say it is too

forecast for US robots

early to judge the machines.
"Robotics is a small industry," says Jim Albus of the National Bureau of Standards, "and the trends have yet to be studied. As for industrial robots is growing at a good clip. Last year, about 15 robot manufacturers and disindustry standards as well as conducting research in the field

for other government agencies.
Additionally, neither robot manufacturers nor distributors are anxious to describe their ness in detail, "Everyone in the business is afraid to talk," says Cincinnati Milacron, a robot manufacturing company. "We've got a good thing going and we don't want to encourage

others to get in on it."

The effect of robots on employment levels is also unknown. Many robot suppliers say that their machines actually increase employment. Others

"A robot doesn't take a man out of a job," explains a spokesperson from DeVilbiss, distributors of spray-painting robots. "It takes him away from a boring or dangerous environment."

No complete surveys document the robotics marketplace but most industry observers agree that the field is dominated y one name — Unimation.

Unimation was founded in 1958 by Joseph Engelberger, a physicist. His numerous contributions to robotics are commemorated by the Robot Institute of America, RIA, the industry's trade association, which has named its highest accolade, the Joseph F. Engelberger Award, after him.

Today Unimation, headquartered in Danbury, Connecticut. manufactures 10 different industrial robots ranging in price from under \$25,000 to over \$100,000.

Unimation claims to control bout 75% of the US robotics market, but many experts quote numbers closer to about 40% or

Along with most of the US robotics companies, Unimation has close ties with the automotive manufacturers. One of its robots, the Programmable Universal Machine for Assembly, Puma, was developed in collaboration with engineers from General Motors. Puma will be used by the automotive giant to assemble small, lightweight components — over 90% of the parts in a GM car weigh less than five pounds.

delayed

An uninterruptible power sup-ply which interrupted has been blamed for the delay in getting out New York's newest news-paper, the Wall Street Final. Intended to be on the arrests with the day's closing prices in

Intended to be on the atreets with the day's closing prices by the time the broking fraternity heads for home, the paper did not hit the streets until 7.45 pm when it issuecised last week.

According to publisher Micheel Goldstein, the problem was caused by a meltunotion, late the previous week, in the power conditioner for the computers he is quoted by the Wall Street Journal as saying the melfunction "caused the computers to conk out" and the damage could not be fixed in time to melet the launch day deptime.

Call for

papers

Michigan. The company says it now has some 900 robots in the field, aithough it is not disclosing any actual sales figure. In order to enlarge its robotics Newspaper offering, Prab recently bought AMF's Versitran Automatics Systems division, which has launch been making robots since 1834.
The acquisition also gave its talamazoo company AMF 59 tablished worldwide marks.

Coverage.
The basic Prab robot sells in about \$24,000. The Versitra robot starts at \$40,000 and ranges up to about \$110,000. Prab, which has been manuse turing robots since 1968, and makes bulk conveyors for the pharmaceutical and metal lo

panies nor the association

publish accurate market figure. For this reason, a number of

robot vendors can claim the No2

spot behind Unimation.

Cincinnati Milacron says that its

1980 dollar volume will exceed

that of Unimation. "The exact

figures are a secret," explains

the company, "but we're going to give Unimation a run for its

Cincinnati Milacron markets

two robots, its standard model

To and its heavy-duty model

HT'. Prices start at \$65,000 for

both models, and go up as special software and tool fittings

Although the company has

made robots only since 1977,

demand for its computer controlled machines has grown

to the extent that the company built a new factory for robot

manufacturing last year in

Greenwood, South Carolles.

explosion," says a spokesman

we've had orders coming in for

tens and even hundreds of

Besides building robots, the 98-year-old Milacron also

manufactures machine tools,

ductor materials. The compay, which employs about 13,000

workers in six countries

reported 1979 sales of nearly

Another company making

Prab Conveyors, of Kalamazoo

During the last six months.

We're just at the start of a

dustries. · The DeVilbiss company which markets a Norwegian, made robot, dominates a where there is little competition spray painting. Trallia, the manufacturer, says that it machines account for 95% of this

robotics market.
The DeVilbiss/Trailfa robotic The DeVilbiss/Trailin room
priced between \$70,000 and
\$100,000. The high end of the
price range includes option
such as computer control, noise
filters, alternate arms, water
cooling, and counterbalance
which allow the robot to be in which allow the robot to be in stalled upside-down from

ceiling.
Tralifa, which also manufactures transport equipment. et ered robotics in 1964. In 1974. ered robotics in 1964 in 1975
Devilbiss and Trailfa signed in arketing agreement, slying the Toledo, Ohio vendor a first footing in the small market.

Since then, Devilbiss has sold about 100 Trailfa robots in the

On takeover traff

PAPERS are invited for presentation at PTO 81 the Pacific Telecommunications Conference, which is to be held on January 12-14, 1987, at the likel Hotel, Honolulu, Hawali. The objective of the conference is to provide a forum for the discussion of technical, economic regulatory and social aspects of communications throughout the Pacific Three copies of papers should be submitted no later than July 18, and should not exceed twenty pages The conference is organised by the Pacific Telecommunications Council, For further information, contact Richard, Barber 22/24 Malla Way, Room 704, Monolulu, HI 26822, Tel. (808) 841, 5789. following its takeover plotting side of Calconia Sant era Associates is planning to so Talos Systems of Sco Talos Systems of Scounsell Arizons in a share exchang Arizons in a share exchang deal valuing Talos at about 6 million. Talos had prollist million. Talos had prollist million talos at a million last year.



Israeli-Arab joint effort

world's most unlikely sites for a VDU and microcomputer manufacturing plant. Yet that is where Elbit, Israel's only computer manufacturer, has chosen to build its DS 2000 and DS 1920 displays, and a forthcoming microcomputer built around

> pected to come from either that there would be any work in

to make terminal manufacture necessarily complex. The Aregon system is favoured for the possibility of run-ning it on Brazilian-made computers. But Telesp would rather do business with a fellow trial is planned to start late next do business with a fellow year with 1,500 terminals in telecommunications administration and buy British Telecom's Prestel system, which is de-

British Telecom or Aregon In-ternational, since the Canadian

Telidon system is thought likely

effort to win the interest and the co-operation of independently-minded Druze community.

CHINA has bought its first used IBM 370/138, from OPM Leasing

Dalyat-el-Carmel — and the fact

that other companies have not followed Elbit up the steep

mountain roads to the village

suggests that it took imagination and a substantial persona

Most striking feature of the a 32K cache. The 7.571 is also a duel pro-

new machines is that they will be built in emitter-coupled logic, ECL, circuitry designed and manufactured by Siemens, and will be backed by Siemens' own 64K-bit memory chips. ECL is a high-speed techno-

logy unit recently used only in large computers because its high power consumption caused cooling problems which were ifficult and expensive to solve. ICL in collaboration with Motorola was one of the pioneers in its use, and all the 2900s from the 2970 up use ECL.

Amdahi's 470s also use ECL, and it is the technology expected to be used by IBM in the H-

In the past couple of years it has been introduced in lower level products, notably the Univac 1100/60 and the SEMS Mitra 525 mini, both of which use the Motorola 10800 ECL bit-slice

Smallest of the four new models is the 7.536, which is a direct counterpart to IBM's 4331

5,000 Micrals

FRENCH microcomputer pioneer R2E, 60% owned by CII-Honeywell Bull, has installed its 5,000th Micral microcomputer. Turnover in 1979 rose 50% to FF 35 million, £3.85 million on which it made a profit of FF 1

Japan-US cable

AS part of the Japanese govern-Aspart of the Japanese govern-ment's policy of increasing the amount Japan buys from abroad, Nippon Telephone and Telegraph has proposed to American Telephone and Teleg-raph a joint project to develop a submaring optical flore cable for use between the two countries.

Siemens adds four models to 7.500

UNDERLINING that it really means business these days, the The 7.536 has an 8K-byte cache means business these days, the revitalised Stemens Data has and two or three megabytes of added four more models to its main memory. The 7.351 has a 7.500 line of small and medium-16K cache and up to eight scale mainframes. Premegabytes of main memory, ounced as Siemens' answer while the 7.361 is a dualto the IBM E-series, the line now processor version also with up to eight megabytes, offering dou-ble the power of the 7.351, and covers a much broader spectrum than IBM's 4300 range.

cessor machine, four or eight

of Scotia, New York.

available in the autumn.

BRS has its own retrieval

there are additionally a 7.521. 7.531 and 7.541 - run under the BS2000 operating system, which is akin to IBM's OS operating

All four are set for first ship ments in the first quarter of nex

year, and the machines are an-

nounced in Siemens' Continen-

All the 7.500 machines -

a 64K-byte cache.

Prices online from US

UP-TO-DATE specifications and IBM's Stairs with modification prices for computer products and enhancements, and the listed in the Auerbach reports software is to be offered as a will soon be available over Tymnet and Telenet from Bibliographic Retrieval Services

A sample database is already up on the BRS system, two 370/ 55s with accelerated memory. and the full service is due to be

software, which is based on

product by the company from The Auerbach service will be

updated daily and will be accessible by any subscriber with a Tymnet or Telenet-compatible erminal. Auerbach has not yet decided whether it will be offering a specific terminal to



From somewhat modest beginnings, we've grown into the largest supplier of computer software based in the U.K. In just ten years we have established twenty centres throughout this country and Europe; now our staff numbers over 1,500 and our turnovers topped 25 million.

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We've grown up a lot in ten years.

A.Decace of Dataskil



BRAZIL'S Ministry of Communications has given its authority for a three-year

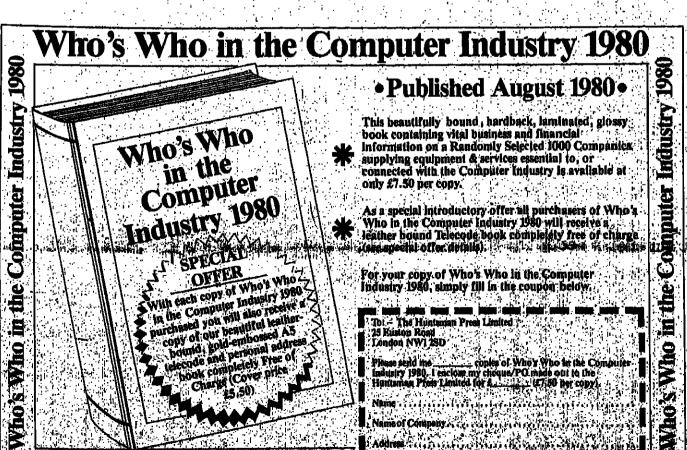
viewdata trial to be run by Telesp, the country's largest telephone company, which operates in the State of Sao

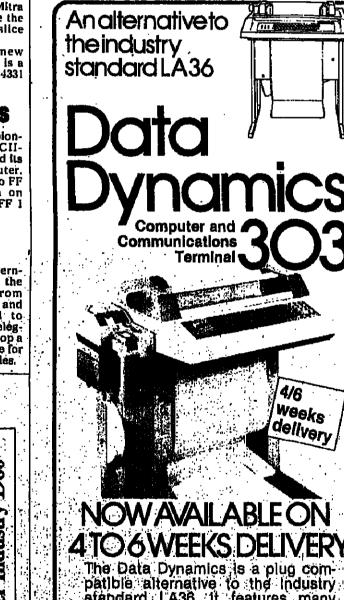
Paulo.
The project is being managed by Brasilinvest, a merchant bank and development company which, conducted a feasibility study from last November. The

nes and offices. Several UK viewdata adapter makers have quoted to supply, and it is likely that local manufacture will take place under license will take place under licence from one of them. be made locally.

Who's Who in the Computer Industry 1980

China's first





Improvements including a rugged metal case, illuminated platten. paper storage facilities and takes up ess floor area. It is available with or without a paper tape punch and reader.



HEAD OFFICE: Data House, Springfield Road, Hayes, Middlesex. Tal. 01-848 9781, Telex; 935429 Erskine/House, 98-73 Otieen Street, Edinburgh/ EH2 ANF Jel: 031-226 620172

60% of tellers will have terminals by 1990—PA

directly serving the public will be aided by teller terminals at 60% of counter positions. This is one of the main predictions in a automation over the next decade now available from Pactel, the computers and telecommunications division of management consultants PA

The study also predicts a big increase in the number of cash dispensers and automatic tellers from 6,300 today to 50,000 by 1990. But the overall impression the next 10 years.

Pactel interviewed 270 banks in 13 countries throughout Western Europe and found that \$1 million study into bank most expected their computer operations to be ctill based on

Lack of enthusiasm for distributed processing stemmed from the size of investment in centralised systems, the unproven economic advantages of distributed processing, the centraised nature of the management and security.

There is also a very cautious is that there will be no attitude to electronic funds account or Barclaycard account revolutionary changes in transfer systems and Pactel can now be directly debited.

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D3000—top or front load, single platter cartridge drive up to 24 Megabytes.
D8000—sight inch Windbester drive, 20 Megabytes in Boppy size package.
—mire Roppy, 280% bytes, single bead, FD860—mire Roppy, 800K bytes, druble bead.
FD850—standard Roppy, 18 Megabyte double head.

local EFTS networks would be which banks avoid the expensset up during the 1980s.

One network already in operation is at Bourg en Bresse in France where more than 50 merchants have IBM 3608 terminals linked online to an IBM 370/138 at the Banque Regionale de L'Ain so that customers' accounts can be directly debited (CW, March 15, 1979).

in the UK, Barclays Bank is involved in a pilot project called Counterspeed with six petrol stations in the Norwich area where a customer's current

March 1, 1979).
The study embraces building societies and international banks with operations in Europe, but merchant banks are not included. Looking at the US banking industry the study pre-dicts that banks here will be spending \$400 million a year on automation by 1990 and that the value of all kit installed by them will be \$2,100 million

of physically exchanging and

sorting cheques, will also make

slow progress in the 1980s,

according to Pactel, Develop-

ments in this area include ex-

periments with cheque image

capture, transmission and sor

ting being carried out by NCR in

co-operation with the Bank of

America in California (CW.

November 9, 1978) and by Bur-

roughs in conjunction with the Midland Bank in the UK (CW,

ICL is hoping to capture a share of this business through its marketing agreement with bank terminal manufacturer Fortronic, which has been extended to cover product deve-

lopment (CW, March 13). The study, originally commissioned by several suppliers of bank automation equipment, is now available in several versions and subsets costing from \$2,000 upwards to \$15,000 for a complete study.

Automation in European Ban-king 1979-1990, PA Computers and Telecommunications Ltd, Rochester House, 33 Greycoat Street, London, SW1P 2QF, Tel: 01-828 7744.

Systems builders order Primes

FIVE Prime 150 computer systems have been ordered by Alternative Business Systems, a UK firm of systems builders that specialises in turnkey systems for real time commercial applications such as sales order pro-cessing. Employees run the company from their own homes with the help of a network of

industry surveys published by Venture Development Corp in the US. The surveys, called Venturecasts, are available at \$1.050 and in the form of a 350.

\$1,950 each in the form of a 350.

Rival standards for local networking

LOW-COST local networking using multiple Z80A-based processors has been announced by Zilog. Called Z-Net, the principle of the facility

Net, the principle of the facility

Two kinds of station are processed by the station are processed. is to use low-cost hardware in order to give each user local computing power while sharing high-cost peripherals such as printers and large discs between several users.

uriven by the 2.50A. The MCZ-2 is an existing business microcomputer, and can be configured as a multiline controller offering IBM 2780/3780

The single data channel which connects the Z-Net elements is a low-cost coaxial cable running at 800,000 bits per second. Stations can be added or taken out of the network with no disruption pro-vided a T-tap is already avail-able in the cable.

Key to the system is the multitasking operating system kernel which runs in each processor on the system up to a maximum of 255. There is a network software overlay for all nodes which need to com- in-house all nodes which need to com-municate, and the packet pro-capability. Deliveries are tocal itself consists of five within 60 days of order,

DEC, Intel, Xerox joint specs developments

SPECIFICATIONS for a local in-house use. It involves area communications network are to be developed jointly by Intel, Xerox and Digital Equipment, and published this sum-

The companies feel it is in attached to the links vis their interests, as well as in the transceivers which grab interests of users and other packets addressed to them and manufacturers, to provide for the compatible interconnec- far as possible transmitting the compatible interconnection of a wide range of information handling products at low cost, and aim to give a good boost to their method of achieving it.

Several other manufacturers are said to be interested in making compatible systems.

Consumer electronics market survey

page book of statistics and online information service such forecasts taken from major as Lockheed, Dun and Bradspecialist periodicals and organised in the categories of the US government's Standard Industrial Classification, published in the last pine

CONSUMER electronics is the phone-in service on the latest munications, semiconductor information, the price of which and other components, and be information.

is included in the subscription.

It is planned to put the infor-

mation on to a computer within the next year, either in-house or

in co-operation with an existing

rial Classification.

They are backed up by a months were on computer comlesley, Massachusetts William

monitor the cable to avoid at

presently supported, both driven by the Z80A. The MCZ-

support for communication

with the outside world. The

new SDS 2/01 shared data sta-

tion consists of a 10 megabyte cartridge drive with dedicated

Cobol, Basic and PL/Z and be-cause of the well-defined in

terfaces between the operating

system layers, users can wi

their own operating software to enhance the basic kernel.

The Z-Net system will be

sold primarily to OEM systems

houses and to large users with

Languages offered are

strumentation.

The consumer electronki

survey deals with issue it

cluding viewdata and taking revenues projected until the year 2000, projected parable computer and language frankt tor markets, and current to markets, and current to markets.

mand for electronic gaines.

are said to be interested in making compatible systems and components, and the partners are keen to have the specifications adopted by official standards bodies.

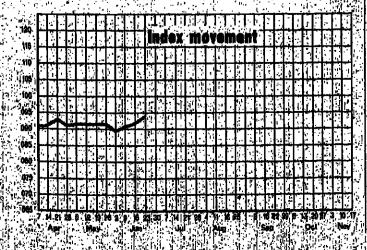
The network design is based on Xerox's Ethernet, which was published last December transceiver design and comafter live years of experimental puter network operation.

CW SHARES TABLE

				Minney Carrier	Granda: 11101		
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ı	1980	Block	Price Cinge.	1880	Stock	Price, C'nge	1
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	125 W 1214r	Thorn-SMI 12501 Xerox (\$1)	000 1234 10 la	6.548	Resident Property		J.

The table shows the closing prices in Lighteniand New York At the Add.

I was work. The share index is based on the prices of the UK companies in the



COMPANY NEWS INVESTORS and analysts have long instance, that future profits look uncertain gauged a company's attractivenous as an investment by dividing the price of a single

investment by dividing the price of a single share by the sernings per share to produce a "price-earnings" or PE ratio, and go on to talk about a company selling at "only three times carnings" or at "almost 20 times earnings".

A low price-earnings ratio can mean, for

by the number of shares outstanding, and and that a lower dividend may be paid. A then dividing this into the share price.



The four new Racal-Decca

companies are defence radar,

navigation, marine radar and

BRITISH Telecom has an-

nounced that its National Data Processing Service has joined

the Telconsult consultancy ser-

vice, which was formally set up

last year, to add computing to

the expertise it sells overseas.

Consult service

A company with a low price-to-research

National Semiconductor, selling at hot-ween five and six times R&D expenditure. look particularly interesting to him. million this year, that means at least £60 Applying the same yardstick to ICL suggests that those who say it is still pence per share, and at last Thursday's lificantly undervalued by investors are

Unlike US companies, ICL does not reveal its R&D expenditure, but it is at least

Computer firms top

only 3.3 times research expenditure

Racal gets back into its old groove

reported at the half-year stage,

nover up 16.3% at £263.7 million.

With Decca consolidated,

dary historical growth to resume

in the current financial year,

Decca is expected to con-

tribute £150 million to this figure

and to break even. Losses from

Decca, originally put at £6 million and subsequently revised to £10 million, will be even more.

although Racal cannot say yet

by how much. All the losses are

attributed to Decca's consumer

businesses and the Decca TV

Most dramatic turnover surge

came in the data communications field with the small Racal-

Vadic of Los Angeles leading the way. Sales were running at \$12

million before Racal acquired

the company; they rose to \$20 million the following year and

are now up to an annual \$32

Racal-Milgo is also doing well,

particularly in network management systems for large

customers and as a result the

data communications group stormed ahead more than 40%.

company is up for sale.

with the target £500 million.

gram in connection with the orders for tactical radio, transfer of its records business Racal's pre-tax profits were up only 3.25% at £63,624,000 on turwill cost Racal more than expected but otherwise, the outlook for Racal in 1980-81 is Rucal is looking for its legen-

Hit principally by the tardy

Plug into Mexico

REFLECTING the attractiveness of Mexico as an investment been found to be floating on a giant oil field, Northern Telecom of Canada has formed a joint venture with Alfa Industries of Monterrey to manufacture Northern Telecom's SL-I and SM-I digital telephone switching sys-

Trend reversed

FURTHER evidence that the declining cost of computer temporary reverse, comes from Amdahl. In the US the company has increased lease prices on its V/7 and V/8 computers between 7% and 13.6%, while the sale price of the V/7A goes up 12.6%

on July 1. Maintenance charges rise by 5% to 7%.

On the move

THE UK-side of data capture and distributed processing systems supplier, MDS, has changed its name from MDS Data Processing to MDS Computer Systems (UK) Ltd. The firm has moved its UK head-

As a result, data communications has overtaken radio communications as the biggest. first time. Radio fell from 44% to 38% of the total business, while

data rose from 32% to 39%.

In the future, Racal looks forquarters from Victoria, SWI to 84 Upper Richmond Road, Putney, London, SW15. Tel: 01-874

B404.

quantify them because of changed accounting rules. Turnover, however, is clear

the company grew 27.4% to FF 470 million, about £52 million, with exports accounting for Fi 127 million, up 24%.

'Substantial'

losses for

Logabax

EADING French CEM Beripherals and small systems

manufacturer Logabax has con-firmed that it made substantial

losses in 1979 (CW, January 17), but says it is not yet able to

The company has implemented stringent plans for the current year to get its business back into profitability.

US business league

TWENTY-FIVE of the top 100 small companies in the US are in the computer and computer equipment business. The ranking, arranged according to percentage increases in sales and revenues for 1975 and 1979 financial years, has Tandem Computers and Cray Research

at its head. The list was compiled by Inc Magazine, a journal which focuses on "the big business of smaller companies". To qualify, companies had to be independent, publicly held, at least four years old and having a turnover of less than \$25 million in 1975.

Tandem of Cupertino, California, maker of multiple

processor systems, is No Lon the list with a compound annual sales growth rate of 358%. No 2 is large scale system manufacturer Cray Research with a compound annual growth rate of 338% Other computer companies in

the list include Cado Systems, Floating Point Systems, DPF, rintronics, Prime Computer

and Paradyne. In addition, some of the compunies were among Inc's top 20 performers ranked according to productivity and profitability Data Terminal Systems ranked No 2 in profitability with its net profit as 20.2% of its sales. Cray Research, with its net profit as 18.3% of its sales, was No 3.

He's no genius, but we bet he controls his stock better than you control yours. Do you, for Instance, know the Nixdorf computer systems in 70,000 turnover rate or the turnover period situations throughout the world. Please send me turther details. He's just one of the Nixdorf. COMET Strok Control C

of eyery article in stock? How much capital is tied up on any

specific article? Do you know what proportion of

turnover is represented by any parlicular product or product group? He does. He has these answers and

hundrede more within seconds of " asking. As a result his company is: saving thousands of pounds in Interest on the capital no longer fled up in stock. He uses the COMET, Stock control package from Nixoon, Who is he? He's just one of the people using

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He's just one of the Nixdori ::

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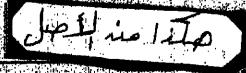
27 years of experience Nixdori have invested in developing opmbular systems for companies all sizes. Af mans disposal Right

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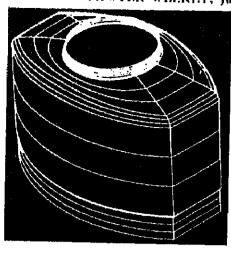
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Centre dedicated to spread of knowledge

WHETHER as a result of lack of tran and designed to be used in a computer and NC machine. investment capital or simply in-grained conservatism. British on any machine. The process industries group is working towards the produccompanies have been slow to adopt computer-aided methods. was established in 1969 to accelerate the process by assisting companies in all aspects of the move to CAD/CAM.

The Centre is a government body staffed almost entirely by employees of ICL Datuskil, and its services range from the de-sign of large systems for chemical process control through to the production of responsible for finance, sales numerical control tapes and and marketing, production and actual components. But it is not a software bureau in the conventional sense and does not get involved with the minute detail

of applications design.
"The Centre's original aim was to develop the market for computer-aided design and manufacture in engineering," said Mike Evans, manager of the manufacturing industries group.
"This market is now very lively. and we are concentrating on helping companies make use of specific companies.

CAD/CAM in the most efficient One of the group and cost-effective way. Our part is played at system level, to help the customer integrate CAD with whatever DP systems he may have, and not, as a rule, to design components, for in-

Basically, the Centre is concerned with the spread of knowledge. Nothing must be wasted; no job can be a once-off job. Knowledge acquired on a project must if possible be en-capsulated in a re-usable form and made available to as many users as need it. This requirement has given rise to the design philosophy of "program building blocks": products designed to be used together or separately; and to form together a complete library of CAD/CAM alds. Both hardware and software "blocks" are designed to be completely machine-inde-

pendent.
"Technology transfer" is a favourite phrase among the inungement of the Centre: experience gained in one field can be the control of often be used in another. Design projects are undertaken in colrojects are undertaken in col-aboration with customer com-Part programming is now the

projects are undertaken in collaboration with customer companies, with a two-way sk-change of knowledge, the "building blocks" are marksted ilrodigh agents, so as to reach as wide a public as possible; and this Centre runs a jobbing shop producing metal components and printed circuit-books, with the experience of domputerised outling small components and printed circuit-books, with the experience of domputerised outling small computerised outling small computerised outling small computerised outling the part exactly ended by the NC machine half-punching the tape and sain of giving small computerised outling it actually to produce a part. The test part will show up outline control and other metalods before taking the plange into CAD (hemselves.

"The Centra can acticle while plange into CAD (hemselves."

"The gentra can acticle while risk project; and use line results of the research to benefit other companies," said Evans.

"These principles are easilized in the information be written fast enough to supply the NC machine downsine." For supplies are easilized in the information be written fast enough to supply the NC machine.

With GNC, almost the whole indicatory and written fast enough to supply the part easily to recess is dompite point of machine downsine. If process is the wasting in the part action be written fast enough to supply the NC machine downsine in two diseases in the supplement of machine downsine. If process is dompite point of machine downsine in two diseases in the components and consists of definition to the research to abonatine the part. The test part will show up to the process of manufacturing components and consists of the process of manufacturing components and consists of definition to the part action of machine downsine. If process of manufacturing components and consists of the part action of machine downsine is action. In the part action of machine downsine is action of machine downsine. If process is time wasting in the part action of machine downsine is action of machine downsine.

sections; manufacturing in- packages for the design, con-The CAD Centre in Cambridge dustry, process industries, struction, and operation of research and devolopment, and production services. "It is structured and run like a small company," said Mike Evans. "We are storage tanks was developed organised like the people we are trying to help, not just as a research shop." It is headed by the Director, Paul Fleet, "effectively our managing director," and a board of four controllers

> development, and research. The manufacturing industries group is divided into several specialist areas in the field of velopment: computer-aided planning, integrated engineering information systems, numerical control and draughting systems. Its aim is to extend the technology in these areas and to provide an interface to CAD systems which can be tal-

lored to the requirements of One of the group's principal products is GNC, Graphical Numerical Control, a package which provides a good example of the way in which CAD can speed up a manufacturing process. GNC helps produce input tapes for numerical control machines, thereby saving materials, man-hours and production time.

NC machines, widely used in industry for the last 15 years, are computerised lathes, drills, flame-outters, etc. which pro-

duction time.

The Centre is concerned with the spread of knowledge. Nothing must be wasted; no job can be a once-off

duce components from paper

The Centre is divided into four tion of a library of integrated

its Tanks package for the design of circular low-pressure jointly by the Centre and Capper-Neill International, Sections of Tanks have now been adapted by W. W. Wild (Engin-cers) of Mansfield, once again justifying the Centre's policy of designing for a wider applicability than the use of just one

process design, physical properties data, vessel engineering, project engineering and pipe-

> include Concept, a comprehensive system for process design and simulation for chemical and associate industries; an allied product, Multicol, for the design and simulation of distillation columns and interlinked towers; Stem, for heat exchanger design and draughting; and PDMS, for plant and piping layout. The lat-ter was developed in conjunction with Akzo Engineering and

Isopipe.
"The group exists to aid the

"There is a shortage of skilled labour in this market, and CAD techniques can supplement the available supply of workers."

The production services group offers small businesses a way of taking advantage of CAD techniques without investing in prohibitively expensive equipment. It offers part programming on a jobbing-shop basis using GNC and supplies fabrication drawings, NC tapes and printed circuit board artwork.

Pye Telecommunications has used the service to produce over 1,000 printed circuit boards. The customer.

"The group exists to aid the production services group uses
The process industries group designer in this field, not to GNC to provide a part program
Turn to page 19

ships' propellers for various customers, using the Centre's three-dimensional

The service also enables companies to try out CAD methods before taking the irrevocable and costly step of switching from their existing systems.

The research and development group exists to develop components which can be use in engineering applications. The Gino suite was produced by this group; and the Centre is curently marketing three pieces of

NANCY POCOCK REPORTS ON THE LATEST DEVELOPMEN AT THE COMPUTER-AIDED DESIGN CENTRE, CAMBRIDGE



• From page 18

hardware it originally developed for internal use. The largest of these, a colour

raster scan display unit, goes by the misleading name of Bugstore, though its official title is AGDT, Advanced Graphics Display Terminal. It computes pictures with true perspective and shading, with hidden surfaces removed, and can handle large models, for example large urban developments. Sequences of pictures can be filmed, simulating a tour through an area. Photographs of real scenes can be reproduced and scanned, and mixed with computer-generated

An interesting recent applica-

facial recognition system at present under evaluation by the Home Office, a kind of Identikit system in which the faces are based on photographs and thus more realistic than drawings.

The colour map can be changed interactively, making the device useful in applications for designing such products as carpets and wallpapers. Bugstore has been imple-

mented on the Prime 300 and 400 and the PDP-11/34 and 770, and the Centre is prepared to implement it on any other machine. Several have already been sold. and more are under construc-

the Remote Data Switching

tion was the development of a Unit, which allows any two ter- for most of the work done. The minals such as a storage tube device, printer or plotter to use the same modem connection to the computer; and the Remote Peripheral Controller, a microbased unit which permits the connection of such perlpherals "We chose Prime machines as incremental plotters and

> not provide these options. A staff of well over a hundred programmers needs a good deal of hardware to work on, especially as all the Centre's editing work is carried out online - there is no batch processing at all.

paper tape renders and punches

to computers which normally do

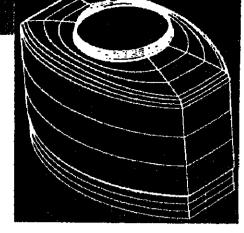
Prime minis and Tektronix storage tube VDUs are most heavily represented and account

service for the Cenfre, mainly taken up by program development. There are six Prime machines, a 550, a 400 and four

because the type of work the Centre does requires the use of a fairly large mini," sald Cliff Jones, computing services manager, "In 1973 we were using an Atlas II mainframe with virtual storage, which could run large programmes and provide an interactive time sharing service. We looked for a machine with these features which would be able to take advantage of progress in tech-nology and would also be one

our customers could afford. The Prime machines were the only ones at the time which combined all these features, and we've been very happy with

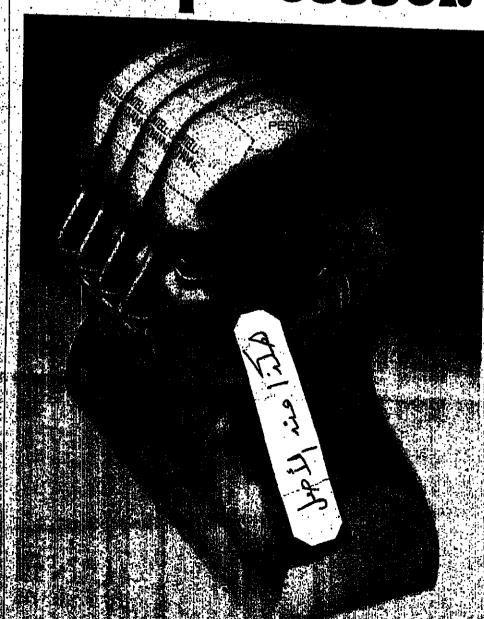
The Centre also owns a Digital Equipment PDP-11, which is used for further development and support of GNC; and two Computer Automation nuchines, a 4/90 and a 4/30, are used for specialised program development not carried out in a time sharing environment. It is hoped that the use of the latter will lead to the development of low-cost systems for smaller companies. visualisation to Online to the Prime machines also be resumed.



and there is also a Calcomp 748 standalone flat-bed plotter, and a Kongsberg draughting machine which can produce per and ink drawings and the kind of photographic output used in the manufacture of printed circuit

Over the next two years, it is intended to expand the Centre's work on the use of micros in -computer-aided engineering systems (which has already produced the Remote Peripheral Controller) and on database technology. Research on three-. dimensional modelling and visualisation techniques will

Now. Argus 700 Series 2. Multipower, Multispeed, multichoice Multiprocessor flexibility Argus 700 Series 2 is based on new versions of the Argus 700 Fand central processors which can be used individually or in closely coupled.



individually or in closely coupled 🥇 🕍 groups supported by a multiprocessy operating system. Putting these together in various ways gives you a performance ratio of 7:1 between the smallest and largest configurations and matches the needs of almost all control, communication and information handling applications:

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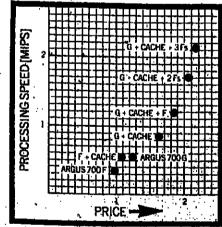
You can now use a local or cache nemory for each Argus 700 rains cache memory for Argus 700 G in addition to the main memory Using cache memory reduces the load of the memory bus and can speedup processing by as much as 60% When the local memory is used to hold a processor's program and dala local operations make nodemands of the memory bus at all, leaving it freely handle high speed interprocessor communication.

Intelligent channels relieve central processors

As well as multiple central processors Series 2 hardware include intelligent input/output channels will intelligent input/output channels will fixed programs to handle routine operations. They have access to the memory bus and operate in parallel with central processors. Using As well as multiple central

It's the second generation Argus 700. now with multiprocessor capability, a spectrum of power going up to twice previous speeds and a better performance/cost ratio.

intelligent channels takes a lot of load off the processors. The channels work on chained input/output transfer commands and interrupt the central processor only when the chain is completed. They can trap errors and try repeat transfers on their own.



Argus 700—the right choice for dual systems

No one has more experience than etratiti in designing compute systems for critical tasks like the

control of nuclear power stations and electricity grids, where dual computers with automatic changeover are the best means of ensuring security of operation;

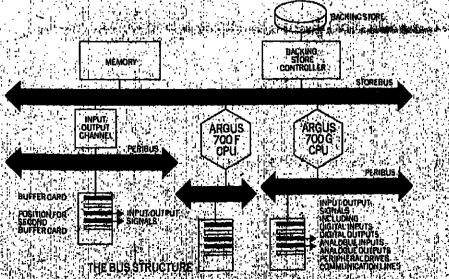
The architecture of Argus 700 Series 2 provides for pairs of computers to share memory and backing stores and to access common input/output drivers. You can either have a master/standby system or divide the load equally between the two computers with the provision that if one fails the other takes over the whole, or critical parts of it.

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Everything in the Argus 700 Series 2 range is directly compatible with earlier Argus 700 computers and software so you'll have no problem in updating or expanding existing

The system builder's

-erranti are essentially systems people with long experience of taking



total responsibility for system design and implementation.

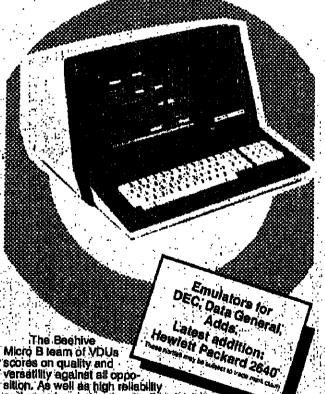
We know the problems. So it's not surprising that Argus 700 Series computers are designed with the solutions in mind and are therefore first choice of so many systems



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GANDALF Data Communications introduces the 9102 x-25 Depucker for use with the Datapac Network and the 9103 S-Mux intelligent data concentrator. Both products are part of Gandali's private intelligent network (Pin) series for data communications equipment.

data concentrator which permits up to 32 asynchronous data links to be replaced dual head drives is available are packed in envelopes and economically by eliminating the from the data recording pro- available in cardboard boxes, multiple links and modems and concentrating the data on to a stugle high speed link, says concentrating the data on to a formats: 256, 512 and 1,024 bytes per record.

The data recording products available in cardooald boxes, each of which holds 10 diskettes.

Data Recording Products Group, 3M (United Kingdom)

Up to 32 asynchronous ports can be connected to the network via a single Datapac 3000 link. Interactive terminals connected via 3101 link anywhere on the network communicate with the host computer via logical channels which are demultiplexed by the Pin 9102.

Gandalf Data Communications Lid (CW), 9 Slack Road, Ollawa, K2G OB7, Canada. Tel:

Elan Digital Systems' EPROM interactive programmer. When entry and manipulation of data is completed, multiple sets of chips may be programmed almultaneously. Personality cards are available for all current EPROMs from major manufacturers. Options are evallable to allow the entry of mester data

The Pin 9103 is an intelligent data concentrator which per-

formats: 256, 512 and 1,024 bytes per record.

3M says the diskettes are suitable for IBM Systems 34 and 5110, Shugart 850 drives and S8502.

Plug-in board for LSI-11s THE Bubble-Tec memory sys-

RAPID RECALL THINKS IT'S TIME YOU SETTLED DOWN WITH INTEL

troller board which emulates the command of DEC's RXV/RX01 (CW), Arkwright Road, Reading, RG2 DLS. Tel: 0734 85464. Hoppy disc software and can control up to 16 memory



tum for the Digital Equipment LSI-11, from Sintrom Elec-tronics, costs about £1,000. 40,960 bytes of non-volatile magnetic bubble memory storage, says Sintrom. The system consists of a con-

Sintrom Electronics Ltd

Add-in for

and software compatible add-in memory system for the Digital Equipment Vax 11/780 minicomputer. Designated MK 8016, the board is a replacement

Mostek says the bourd's capacity is 32K-words x 72 bits or 256K-bytes on a single card. The card measures 15.64 x 11.93 x 0.4 inches and is based on Mostek MK 4116 16K dynamic

Vax 11/780s FROM Mostek is a hardware

for the DEC M8210 memory.

RAM chips.

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NOLTON Communications has launched a family of integrated in irivers designed to offer cost advantages over conventional mod for local data transmission

Asynchronous model 1640 and synchronous model 1630 operate over standard two or four wire DC transmission lines provided memory either by the Post Office or by

These free standing models provide full duplex or half duplex point-to-point transmission at data rates of into 10 200 ilon at data rates of up to 19,200 bits per second. Features include LED status indicators and loopsack diagnostic facilities for 65 in either its bare board for or in connection with other particular with other particular in the connection with the connec

Both models use standard

plug-in cards,
Nelton Communications Ltd
(CW), Fieldings Road,
Cheshunt, ENS STL Tel: Waior in connection with our systems, it provides users will memory expansion path.

A six month warranty is offered and deliveries will be a six of the connection with the connection will be a six month warranty in the connection will be a six month warranty in the connection will be a six month warranty in the connection will be a six month warranty in the connection with the connecti (CW), 18 Market Place, 3rd

Bench top tester for LSI devices

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its 6300 and 5600 bailt at
printers in the UK, Hamilton
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Centronics Data Compate
(UK) Ltd (CW), Velorit its
Burgeas Hill, RH15 and A BENCH top tester that can test RAMs, ROMs, UARTs and most other LSI devices is available from MTL Microtesting of

Called MX-17, it uses a working microprocessor assembly as a reference device, and generates logic sequences for comparison, MIL Microtesting Ltd (CW), 1-15 Butts Road, Alton, GUS4 JEN, Tel: 0426-88022. Sales booked

Memorex toner for the IBM Set Interest called the sales team.

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The problems of training must be problems of training must be problems of training must be problems.

The problems of training must be problems.

The problems of training must be problems of training must be problems of training must be problems.

The problems of t

Eprom interactive testing system

AN EPROM interactive programmer with an EDIT-ASSIST feature that allows the operator to enter and manipulate date before blowing multiple EPROMS has been introduced by Elan Digital Systems.

When used as a production programmer, the P30 offers dykes and level crossings, Key simple single key operation where faults are verified Markets recently opened an isolated and displayed and where full details of the error may be noted, including the an industrial wasteland between a sugar beet factory and a cause of the error such as shore sewerage works on the outskirts tened address or data lines. of Spalding, Lines. It was the When used as a development UK's first fully-computerised supermarket and the computer

tool, Elan says the operatorm; alter data after the master has been entered so that modifice tions to the original programmay be executed without this up development kit.

For real time application where field testing and modifi cation to programs are required the P30 becomes a minidevelopment system in that due. may easily be changed will

When entry and manipulate of data is completed, multiplesets of EPROMs may be programmed simultaneously: sonality cards are available for all current EPROMs from many manufacturers. On the standard model, dalas

entered via a master EPROX but ontions are available to po vide master data entry via tar

label stuck to it before it is placed on the shelves. The 6-digit codes provide en-ough details to produce a cusner receipt like the one shown

in Figure 1, complete with its excruciating US valediction. KEV MARKETS WHITE EGGS 2 .335

contract went to IBM.

The points of sale are designed

to accept both bar coded and

non-barcoded goods, so they are

able to cope with a huge range of

bar codes but which would be

suitable for bar coding are, at

the shortened UPC bar code, and

so each item has a 6-digit UPC

Key Markets manages with

the moment, in the majority.

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The process for checking them out is to slide the bar coded goods one at a time across the scanner as shown in the photo-graph. Each successful slide is followed by an audible bleep to confirm to the cashler that the bar code has been understood by:

Simultaneously, a clear display of the goods that have been purchased with prices, appears for all to see on a marching display. The picture, (above, right) shows that part of the unit lust above the cashier's head.

The scanner incorporates a laser for reading the bar codes and, as it is omni-directions; it can read a code even if it is only being pointed in the general direction of the laser. There is no need for the cashier to line up each item accurately with the laser. As a result; the throughput of each cashier should be much higher than if she had to follow the conventional procedure of keying the price of each item

into a cash register. The object of the installar ricted to a maximum of 150 price look up lines because that is the tion is to decide whether to exclude the investment to the other maximum that the NCR 726 124 stores in the group. David processor can hold in its Agombar, general manager at memory. It is planned, however, to overcome this limitation by he is convinced that the information flow alone enables him national Stores is planning to to run a much more efficient.

more than its fair share of bikes, puters. IBM 3663 terminals plus three other scanners and a terminal very reminiscent of France. It opened in October 1979 on which uses price look-up, but does not scan, to handle tobacco sales. They are linked to an IBM 3660/Bl processor in the shop with another on standby. The price file is maintained at

IN a part of the UK called Holland, which happens to contain shop. He is a grocer and is utterly committed to the com-

systems...so far

No backlash from the

by Nicholas Benwell

customers over PoS

Key Market's Hainault headquarters on its IBM 370/135 linked by leased Datel 1200 lines. Sales data is automatically NCR 255 scanning equipment in order that a comparison bettransmitted to the host computer and so stock levels, cash ween two types of equipment in sales and other returns are maintained and available on demand to Agombar.
The other major manufac-

products from wheelbarrows to chewing gum. In addition, they are able to read both the US UPC turer of slot-scanning equipand the European style of bar ment suitable for supermarket code which is essential during use, is NCR. At the end of 1979 it this transition stage because is estimated that NCR had in-stalled 3 EAN systems outside some US products such as soft drinks arrive bar coded. The bar North America compared with code in those cases has been incorporated in the layout of the labelling on the package. The products which arrive without

IBM's 18.
But NCR can fairly claim that the numerous UK sales of its 255 price look-up systems can read lly be enhanced with the new NCR T. 8255 controller, and other facilities, to provide a similar configuration to the IBM 3660 design.

For example, the NCR 255/T. 8255 systems provide store and check-out rates, auditing, departmental analysis and hourly activity. UK supermarkets with NCR 255 but, as yet, no slot scanning hardware in everyday use, although many are carrying out trials, include Asda, International Stores, Fine Fare and

several Co-ops.

An alternative to Key Markets' approach is being explored by Fine Fare at its Hyde branch which is over twice the size of the Spalding shop and uses NCR hardware. Over 550 of its ownbrand products are EAN coded at source with both bar codes and velocity codes.

A velocity code is a series of numbers that summarises the product line so that the com+. uter can translate it into as detailed a receipt as the IBM one shown in Figure 1.

Ten of its fastest moving lines are not marked at all because cashiers remember what the various details are. As a result, only 1,300 lines are velocity coded at Hyde. Clearly slot-scanning a bar

code is superior to keying in each velocity code, but trials at Hyde show that the difference not overwhelming.
For customers with up to 10

purchases the difference was very small; the advantage of alor-adabating rose with the number of purchases until at 40 items per trolley, scanning was faster than any other scheme . International Stores has three

branches which use either IBM or NCR hardware. All current installations require key entry codes and have varying degrees of price look-up. The two NCR branches have local NCR 726 minicomputers which are restricted to a maximum of 150 price look-up lines because that is the

Sainsbury, the UK's second

biggest chain, is experimenting at Crawley with velocity-coded goods using over 20 IBM 3660 terminals. As at Key Markets, there is an in-store processor with another on standby but the data is processed by IBM at Warwick, Bur coded scanning equipment is due to go live shortly to replace the velocity coded points of sale. By autumn, however, it is to be replaced by

All leading supermarket managers are nervous lest the experience of some of their US opposite numbers is repeated in

customers' approval for the

changes. They tay great

emphasis on the need to demon-

strate that there is no reduction

in information being available to

their consumer - It just gets

produced at different stages.

the same store can be made. Not the UK. In the US there have the sort of scientific comparison been distasteful confrontations in several States which has that some computer salesmen resulted in intense ill-feeling Sainsbury, Key Markets and others have been particularly careful to carn and justify their towards the whole idea of com-

puterised retailing.

As a result, legislation has been introduced in some dis-tricts which requires old procedures, such as price labelling and bar coding of goods, to be continued. On the UK evidence to date there is no hint of any customer-led backlash deve loping, whether justified or not.

sale systems in the UK Nicholas Benwell looks at lirms which have either installed

COMPUTER WEEKLY, June 26, 1980.

* Survey of point of sales systems. Institute of Grocery Distribution,

He discusses the merits of the IBM and NCR systems and

points out that so far there has been no backlesh against PoS systems in this country, unlike what has happened in the US. Benfield is a lecturer at Cran-field Institute of Technology.

Above is one of the point of sale terminals installed at Key Markets' Spalding store. Above the cashier's head is the screen that gives a marching display of goods bought with prices.

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ADVANCED FILE DESIGN - Part 11

IN Part 10 we saw how the choice of a logical data model and database management system (DBMS) determined the choice of file organisation, Ingeneral, the closer the physical storage organisation can mirror the logical data structure and processing then the better the performance of the database. In his part we shall explore the physical database organisation further by studying examples of some actual DBMS.

Inverted files for

database systems

The concept of an inverted file was discussed in Basic File Design. If a file is fully inverted then it is possible to access that file using any of its data fields as a secondary key. Diagram 1 shows the simple motor car database both before and after inversion.

In practice if DASD are being used then access to the file could be provided via secondary indices as shown in Diagram 2. Also it may not be necessary to access the file via every one of its data fields, so indices are only constructed for those fields by which it is necessary to reference the file. This is known as partial inversion.

An inverted file, or set of linked files can thus form the basis of a DBMS, permitting access to the database via any specified key, provided an index has been constructed.

However, from a performance point of view there are three major drawbacks. Firstly that all relevant indices would need xiating whenever a record is added to the file; secondly, that efficient batch processing is only possible in the sequence of the original file (s); and finally that at least two references are required for each record, one to the index and one to the file

However, for query-type database systems this structure can work effectively and forms the basis of several DBMSs such as Adabas and System 2000. A simple example of such a DBMS is the Cromemco DBMS package designed to run on the Cromeinco range of microcom-

This is a single user single file database system. Records are added serially to the database. and indices are maintained for designated datafields (known as

These indices are maintained in sequence, as in Diagram 2, so

STRUCTURES DATABASES

that every addition to the database causes indices to be resequenced.

The overheads caused by this constant updating of index files are quite acceptable in the personal computing environment for which this DBMS is designed, but would be less acceptable for larger scale use.

This type of structure, often in indexed sequential form with secondary key indices forms the basis for some of the smaller scale minicomputer DBMSs as Fiesta, Escort, Cortina, and the well as the mainframe DBMSs previously mentioned. It is possible to support a network data records. This method is suitable model by providing links bet-ween the indices of different database using either magnetic

An IMS database

As mentioned in Part 10, IBM's Information Management System (IMS) is based on a hierarchical data model and offers users a choice of physical file organisation to suit their pro-cessing needs. The IMS packages consist of both a data communications system and a database system; though it is only

the latter that concerns us here The building blocks of an IMS database are known as segments. Each segment may comprise one or more datafields, the highest level being known as the

In the simple example we have chosen, the root segment would be the car-model and the engine segment would be a child segment of the root segment (also a parent segment) in the parentchild structure outlined in Part

There are four physical file organisation methods possible for an IMS data base:

HSAM, Hierarchical Sequential Access Method. HISAM, Hierarchical Indexed

ential Access Method, HDAM, Hierarchical Direct Access Method.

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HIDAM, Hierarchical Indexed Direct Access Method. We shall examine each of these in turn.

HSAM stores the database as sequential fixed length records, each record comprising a roo segment and as many subordinate segments as can be accommodated, overflow segments occupying the next physical record(s). Thus in our example there would be three records, one of each root segment of

engine segments would be part

HISAM stores the root seg ment and as many lower leve segments as possible (remaining segments being held in over flow) as ISAM records, thus it is possible to access_a given root segment at random via its key and thence gain access to the lower level segments.

HDAM stores all the segments separately as a chained direct file, with pointers between levels in the hierarchy and between segments at the same level. Diagram 3 illustrates how the car example might appear using HDAM. There is no significance in the physical position of segments, since they are connected via pointers, though to minimise seek times it is advantageous to place segments which are normally accessed together physically close to each other The root segment is accessed via a randomising algorithm.

HIDAM is similar to HDAM but uses an ISAM file as an index to the root segment and thence to lower level segments by

Both HDAM and HIDAM may take more storage space since each segment has its associated pointers stored with it. However, the ability to access indual segments makes them sultable for online use where rapid response to transactions is

HISAM and HSAM are more suitable for an environment where there are more batch-type applications and few if any

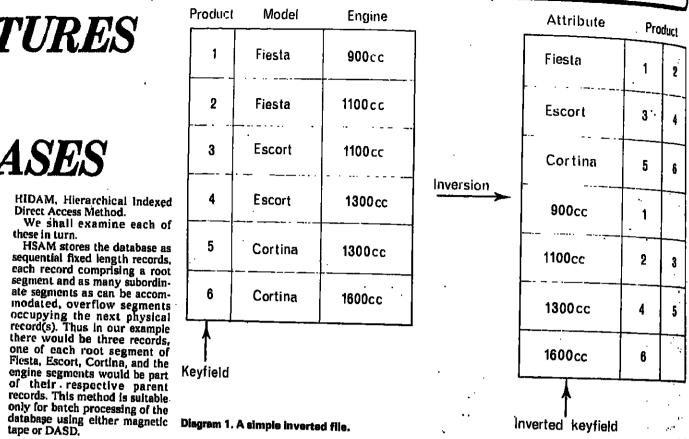
lit is interesting to note that in the early versions of IMS, IBM, was aware of the shortcomings of ISAM and used a special range of computers, including access method (OSAM) to ICL's 2900 series, in which the handle overflow and also to form a basis, for the segment chaining used in HDAM and HIDAM. IMS/VS now uses VSAM referred to in earlier use on a wide scale of the relational use on a wide scale which is suitable for large scale commercial applications—a major pro-

physical file organisations from those supported by the DBMS— if there is a choice.

if there is a choice.

2. Optimisation of individual files by those techniques available for single files, as dealt with in previous parts in this series.

Space does not permit us here to study in detail a herwork the telephonal delahase system in fina, case of the former because of the more complex data model there, may be an even greater overhead. Associated with chaining than with Ms. though Ms. Will now support more



by Owen Hanson and Norman Revell

				•			
Model	in	dex	_				
Fiesta	1	2					,
Escort	3	4			1	Fiesta	900cc
Cortina	5	6			2	Fiesta	1100cc
	<u> -</u>		,		3	Escort	1100сс
Engine	Inc	lex			4	Escort	1300cc
900cc	1				5	Cortina	1300cc
1100cc	2	3			6	Cortina	1600cc
1300cc	4	5				·	440
1600cc	6						

Diagram 2. Use of indices for inversion

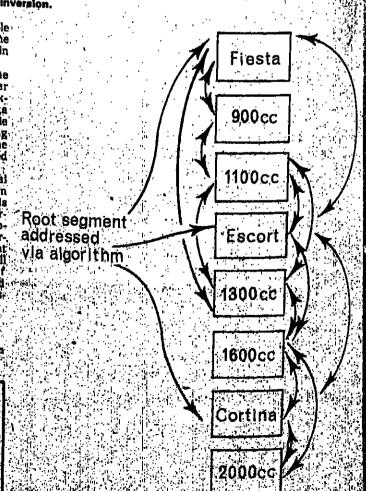
omplex structures than simple hierarchies through use of the logical parent and logical twin

Of particular interest to the reader interested in further study might be the IDMS package which uses the Codasyl data model and is available on a wide

From a flip design point of view IMS Illustrates well the two stages of performance optimisation needed in a database entering the physical file organisations from

REFERENCE I. IMS General Information Manual GH20-0785, IBM.

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Foreign exchange system links into Swift JENEWBURYNIE NEWBURYNIE EW

Grenfell has developed a real time foreign exchange system on its ICL 2960 mainframes which communicates with the Swift Interbank funds transfer metwork in a similar way to the Direct Swift Link on IBM

mainframes. As a result, the ICL - key tation is itself a polling deproved unsuitable to link to the tion. We found that a software

the terminals, but a 1500 with a Computer Weekly.

370/145 at its Steines customer en-gineering centre. It will be running under VM and OSV8/1 and will be used for bench marking and customer

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its features, a few of

which are outlined

Even more startling

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released by IBM in the UK to aid user attachment to British Telecom's PSS packet network. They have been in service for two years in Canada for use with the Datapac, which was the first national packet network to use

TWO products have been the X25 protocol, and have also already been announced in France, West Germany and

One of the products is an extension to the SNA software which runs in IBM 3705 communications controllers and the

other is a hardware Network Interface Adapter which sits at the other end of the line to a 3705, or both ends of a non-SNA

First deliveries are planued for June 1981. The NLA costs £3,276 each or £93.30 a month

1506 Swift Interface Device vice, and this can cause content protocol to link to the GA 16: 460, and thence yra a GA SID to network, and a General solution to resolve the would be the Swift network. The 167460 Automation 16-460 minicom-puter was chosen instead. more expensive than the GA autoke over the role of the SID in the event of failure, and will "The mainframe system polls - manager A. R. Gibson told - also be used as a message

> One 2960 is currently running the live system under DME while the other is running VME/B for development. The first live batch VME system is due in mid-summer, and the full live TP system is set for early 1981, when the 2960s will be run as a dual four-megabyte system

under VME/B.
ICL chairman Philip Chappell
is vice-chairman of Morgan Grenfell Holdings, but Mr Gibson told Computer Weekly that relationships with ICL were strictly at arm's length, "We do not use the connection to get better treatment from ICL and ve are under no unusual pressure to buy from ICL," he said.

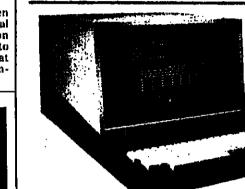
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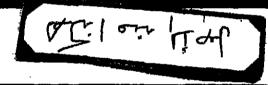
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We are recruiting on behalf of clients, a large West End installation. This opportunity will interest programmers with at least 1½ years' practical programming experience, including COBOL. Team leadership ability is required at the upper end of the salary range.

Ring us now for a confidential talk, quoting ref. 156CW, or leave a message on our answering machine after hours.



Computer Systems Engineers

Office of the future

W. Country.

Cur client requires three experienced computer engineers to install integrated electronic office systems at pilot sites in the Q.K. The heart of the system is a unique distributed intelligence processor. Candidates must be prepared to spend 4 to 6 mills in California for training on this machine. Computer telecommis and software knowledge are required. Your experience will be used to form a base of expertise in this attractive West Country location. Salaries c. £10,000.

Senior Micro Engineer

to £9,000

Our client requires an expenenced microprocessor engineer to join a micro systems section in their process control R & Dicentre. You will investigate, design and install new micro based applications throughout the company's plants in UK. A mix of software and hardware skills is desirable. Suggested experience will be with 280, 6800, 8080 or similar.

Micro Enthusiasts

W. Herts

Bright, young qualified candidates are required to work as programmers and engineers on a world leading micro system. There are opportunities in support, marketing and engineering repair. Excellent ground floor positions

Applications Development Trainee Programmers

C London

A large management consultancy is offening the opportunity for several candidates to develop their programming skills working on package development on IBM 5100, PDP 11/34 and Wang 2200 mints. You must have a degree or equivalent

S/W Development Progs Bedford £6K-£10K S/W Tech Authors Many locations to £9,000

Apply in confidence to Terry Harvey by sending personal and career details, or contact him for an application form, evenings Gt. Missenden (02406) 4705 or daytime as below.



Harvey Recruitment

Executive and Computing Personnel Consultants 500 Chesham House, 150 Regent Street, London WIR 5FA, Tel: 01-734 5351

FREELANCE OPPORTUNITIES **CHECKLIST**

Programmers PL/1 IMS DB/DC

Programmers COBOL CICS

Programmers Honeywell Level 66 COBOL 74 COMMS

Programmers IBM OS COBOL

Programmers IBM Systems OS DOS

ANALYSTS Banking

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Programmers VME/B TP **COBOL IDMS**

Programmers PL/1

Rates up to £400 p w. + expenses Prompt payment in a professional environment for first time or experienced freelancers.

Call now 01-402 0995

Computer Services Manager

The Company is angagest in the implementation of a large network of Hewlett-Packard HP 3000 mini-computers involving all Company fections and based around a large central ICL maintraine. There is a major anvolopment programme of advanced on line systems being built around a distributed database, predominantly in the production planning and recording, inventory control and quality assurance steas

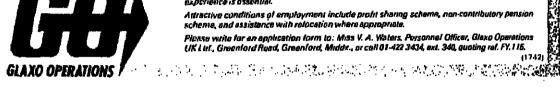
We wish to appoint a manager for the Speke Installation which has two mini-computers, one of which is linked to the HP natwork and the other kinked to a central ICL mainframe.

The successful candidate will manage a team of twelve people and must be able to demo sound technical and operational capabilities and management judgement, and be able to establish good working relationships at all levels in an environment that will demand a high service level and personal commitment. The manager must be able to spesmed developments of significant importance to the Speke factory while also contributing to the Company programme of systems development. He or sho will be expected personally to underlake systems enalysis and have sound programming experience

Experience in an on-line environment and of manufacturing systems in a chemical or pharma-councel industry would be an important advantage and recent management or supervisory experience is ossential.

Attractive conditions of employment include profit sharing scheme, non-contributory pension scheme, and assistance with rolocation where appropriate.

Please write for an application form to: Miss V. A. Waters, Personnel Officer, Glaxo Opera UK Ltd., Greenlord flyad, Greenlord, Middx., or call 01-422 3434, ext. 340, quoting ref. FY.115.



PDP PROGRAMMERS

both in the provision of expertise for real-time and complex software projects, and in providing commercial systems, on PDP and VAX hardware. Specifically at the moment they require:

MACRO or CORAL — to £8,000 — S. OXON

Senior programmer for No. 2 position in real-time project. Ideally, applicants should have Device Driver design experience. Genuine apportunities to move onto VAX or into system design.

RTL2 -- to £7.500 -- EPSOM

Programmers to work on PDP 11. MTS real-time Rader processing project.

BASIC + - to £6.500 - CROWTHORNE

Experienced programmer for work on commercial systems both for first time and also more experienced users. If you are considering a career move Logsys can genuinely offer progressive, challenging and satisfying work, excellent salaries + expenses, and a relaxed, informal but professional company attitude.

To discuss these permanent positions please telephone Mike Wilson on Crowthorns 77921 or 3370 (day) or Farnborough (Hents) 46083 (eve,/wkend).

Computer & Management Personnel, 75 Little Britain, London, E.C.1.

COUNTY SURVEYOR'S DEPARTMENT

invite applications for

Analyst/ Programmer

£5.973-L7.077 (review 1st July, 1980)

The Technical Services Group provides a support and development service to the Department in all non-financial applications.

The range of systems in use includes highway and bridge; design; survey enery sis, managen sitt information systems, are:

The County Council has an ICL 1904S computer which is soon to be replaced by a sarget ICL 2972 machine running under WMEAS. The Department has extensive teclities, initiating ILLE and video terminals, jelelype terminals, desktop computers and a Benson of Jine plotting system. The post currently in gives the conversion of all extention examined by a post currently in gives the conversion of all extention examined by a post currently in a post currently in a post currently in the post currently in the post currently in the post currently in a post currently in the post currently in the post currently in a post currently in the post

Relocation growness payable in appropriate directorist nessessiving select dependent on experience.

Application forms and for experience we stable from the County Survivor, St. Patel a. Hitles, Cuder 5.04 (a. payable from 5.4 Patel a. Hitles, Cuder 5.4 Patel 5.4 Pate

Suffolk County Council

INTERNATIONAL TRAVEL ORGANISATION IN PUTNEY Hotelplan a Swiss-based Company require an

ANALYST PROGRAMMER

to Join their young computer team currently developing new travel systems on their UNIVAC 90/30 computer systems. Hours 9 a.m. 6.30 p.m. Monday to Friday, generous holiday

concessions, L.V.s.

If you have 16 months' experience in COBOL and preferably some knowledge of OS/3 operating systems why not write to us at the address below for an application form enclosing a brief C.V. of previous experience:

Mr. D. Deverill, Personnel

HOTELPLAN INTERNATIONAL

329 Putriev Bridge Road, London, S.W.15 (1708)

RESTORMEL BOROUGH COUNCIL

APPOINTMENT OF COMPUTER MANAGER/ PROGRAMMER Grade \$02 £7,287 to £7,722

Grade SO2 £7,287 to £7,722

The Council will soon be uprating its initialization to an ICL 2003 with 40 K words upin attention 2 EDS 50 disc drives input will be via QDE key attellars. At present the Council operates using a light to the Council county Councy (Council 1904) to the Council county Council 1904 to take from the Law metallation pertain programmely will still be run this way. An enthusiseliar network which will cover both finencial and hall finencial systems. Experience of Cobil programming in establish and RPO programming advantageous, together with a good predites knowledge of ICL utilities.

This is an excellent typoor unity for the right man of women to obtain further experience in computer management, and programming and to steed to the results of the new installation. The boroligh is situated in Mild Conwell and including the power of Mewagapey in the north with up line besides and south. The surrounding rund programmy of Mewagapey in the north with up line besides and specific lives extractive understanded soft in September, 1980 and populations, standing size, qualifications, present poat and selevy, and severy, and past gapentence, together with the serves and 1880 to 1980 to 1980, and past gapentence, septing size, qualifications, present poat and addresses of two referees, should be made by 8th July 1980 to 1980 to 1980. Comment 1928 490.

AEROSPACE PROJECTS

West Germany

Analyst Programmers/ **Systems Programmers** DM 80.000 DM 50,000

Science Systems Ltd., a systems house specialising in the scientific/ technical areas of computing, are seeking to recruit a number of experienced personnel to work on advanced technology projects in

Ideally candidates should possess a numerate degree and have had a minimum of two years programming experience in a real-time environment using FORTRAN and/or ASSEMBLER.

Exposure to any of the following hardware would be extremely advantageous.

SEL 32/70 series MODCOMP 4/Classic **SIEMENS 330 UNIVAC 1100**

HP 2100 ITT 3200 SIGMA 7/9 **HONEYWELL 6 or 66**

Apart from the attractive salaries, Science Systems offers removal and other expenses plus the normal benefits that are associated with a progressive company.

Contact.Derek Ashley at: SCIENCE SYSTEMS LIMITED 60 Kings Road, Chelsea, London S.W.3. 01-581 1481

science systems

IMMEDIATE CONTRACTS **FOR PROGRAMMERS**

IBM 370 Middle East E20,000 P.A. plus expenses

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RPG27DMAS

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These are just a few of our current vacancies;

For further details please contact: NIC POLAND TYLIN PEOPLE A division of Tylin Management Systems Limited Leon House, High Street, Croydon, CR9 3NH 01-680 2323 A member of the TATE & LYLE GROUP

Members of Computing Bayviges Association

MYRIADI

SYSTEMS SOFTWARE PROGRAMMERS

THAMES VALLEY

£7-£10.000

A commitment to new systems software product development has now created a range of positions with our client, a major mini computer manufacturer based near Windsor in the Thames Valley. These are systems software programming positions which will offer the successful candidates the opportunity to perform design and programming work on new software products related to interactive systems, teleprocessing and database.

ideally applicants will offer a minimum of three years of Assembler level programming experience, together with some software design knowledge and the people appointed can expect to contribute fully to all aspects of the development.

The company is pleasantly situated in modern offices and offers benefits including relocation and subsidised restaurant facilities.

POTENTIAL ANALYSTS

Our client is a market leader in its particular sector of the retall industry and wishes to recruit additional Analyst/Programmers keen to develop their own careers into analysis.

Employing the use of database facilities in many applications, the successful applicants will join small project teams assigned to develop commercial systems from feasibility to successful implementation. Biased towards the financial areas of business, candidates will be encouraged to become fully involved in all aspects of systems design, user liaison and system implementation. Formal training will be provided where necessary in all areas of Data

Successful applicants will be able to offer at least three years' DP experience, ideally in an IBM environment, and have had some exposure to systems analysis in an analyst/programming.

In addition to a positive career path a full range of company benefits is offered including a

SYSTEMS ANALYSTS

CITY

TO £10,000

This is an exciting opportunity for experienced Systems Analysts to effect an important career

Our client, located in the City, is speking to expand his range of projects under development by recruiting additional systems stuff.

Two years plus experience.
 Involvement in at least one project.
 The potential for project leadership.

Our client can offer:

A stimulating and highly professional environment.
Excellent career progression.
Extensive development work using advanced techniques.
A starting salary to £10,000 + good benefits.

Our client will also consider Analyst/Programmers who wish to move into a full systems

PROGRAMMERS TO PROJECT LEADERS

LONDON/S.W. ESSEX

Our client has outstanding openings for PROGRAMMERS through to ANALYST/PROGRAMMERS and PROJECT LEADERS. Successful candidates will work within a stimulating and highly professional environment using the most advanced techniques on a range of development projects.

PROGRAMMERS should have a minimum of one year's COBOL programming experience.

ANALYST/PROGRAMMERS should have a minimum of two years' experience, these positions will appeal to Senior Programmers who wish to move into systems analysis.

PROJECT LEADERS should be capable of designing and controlling projects from feasibility to implementation. In addition to real-time experience, a programming background is desirable.

Salaries cover the range £8,000 to £9,500 depending on the position.

The company has an outstanding record of growth and offers a secure and progressive career to the people appointed.

BUSINESS SYSTEMS ANALYSIS

WILTSHIRE

£7-£9,000

Our cilent, a major commercial organisation, is seeking to recruit systems analysts wishing to undertake challenging project work in a highly successful business environment.

Current project work includes the development of teleprocessing systems based upon advanced hardware and candidates can expect to gain valuable new systems experience as well as utilizing their own background to the best effect.

A sound commercial systems background is required together with business systems appreciation as the role will require the development of systems from initial business feasibility, through design to implementation.

The company offers a package of benefits which one would expect from a successful business operation and this obviously includes reliccation assistance to this very attractive area of the U.K. ક કોંગો મું વસાં ધાર મું લેજકોનો લજીવ

TECHNICAL PROGRAMMERS

N. SURREY

c. £8,500

As modern technology surges ahead, so is the demand for machine-oriented programmers who are capable of adapting to a range of small, yet powerful, machines. Our Client would like to discuss the positions which are currently available at their NORTH SURREY offices for LOW-LEVEL PROGRAMMERS seeking to develop "state-of-the-art" software. Some of these vacancies may well be filled by Systems Programmers, currently at mainframe installations, who would like a more interesting challenge, coupled with project management responsibil-

The Company is a completely autonomous subsidiary within a very large group and is therefore able to offer a secure future and positive career to all employees, with rapid advancement for those persons displaying above average talents. For further information regarding these positions, please telephonor 01-353 9981, quoting

REF. S2/2606

ANALYSTS TO SENIOR ANALYSTS

NORTH OF LONDON

Reflecting the demand of their trees, our clients have vacancies for experienced Systems.

Joining a company whose Data Processing is still developing will provide scope for individual advancement and opportunities to take full project control responsibility for certain systems. Employing Database and on-line techniques in nearly all new developments on their IRM mainframes will provide a stimulating environment to design and implement systems encompassing financial, stock movements and business forecasting systems.

Candidates should possess a solid DP background, preferably through a programming discipline, and have successfully dontrolled the implementation of at least one commercial

In addition to attractive starting salaries, comprehensive conditions of employment apply together with the assurance of career progression geared to individual merit and performance.

MOVE TO ANALYSIS

C. LONDON

£6,500-£8,500

Three ANALYST/PROGRAMMERS will strengthen a project team which has just completed the initial stage of a real-time, financial system. They will, assist with the system design; program specification/dayelopment and the subsequent implomentation of the system on advanced mainframe squipment. Grent importance is placed on the "top-down" approach to program design so applicants should be conversant with this melliodology whilst possessing a sound knowledge of COBOL.

On completion of this project, they will join systems teams to investigate user requests and be responsible for the feasibility studies under the direct guidance of a Senior Analyst.

Besed in CENTRAL LONDON; one of the positions will be filled by a Junior person in the solary range \$5.500 E7.500 and the other two cub supect of co \$5.500 p.o. depending on their

REF. S1/2606

MYRIAD APPOINTMENTS LIMITED.

30 Fleet Street London EC4Y IAA Telephone 01 353 0981 24 hours

OPPORTUNITIES WITH THE CEGB

The Central Electricity Generating Board, responsible for generation and transmission of electricity throughout most of Britain, has computing support from a Headquarters Centre operating IBM-based services, Regional Centres using ICL main frames, and minicomputer systems for process control and real-time operation.

PROJECT LEADER/SENIOR ANALYST-NETWORK DEVELOPMENT

More widespread and varied use of computing brings a need to make decisions regarding the form future data communication facilities will take and someone is now needed to contribute to the planning and design of a corporate data communications network and to work as required in progressing software

Applications for this post, based at London Headquarters, are invited from persons holding a good degree in a science or related subject, and have experience in some of the following areas:

programming and program design, including data communications or

data communications, architectures and protocols, trends in computing and data communication.

Ability to consult and propare information for both technical and managerial staff, and knowledge/experience to undertake detailed planning activities, is a firm requirement. Ref. CW/138.

CONSULTANT-PROCESS CONTROL AND SPECIAL PURPOSE COMPUTING

An experienced computer person is needed to work on software projects covering a range of applications supporting data acquisition and plant control requirements. These applications use real-time mini and microcomputer systems to provide data collection and recording. VDU display presentations and telecommunications and control facilities.

Project teams are engaged in design and development of application and system software and advanced techniques are being developed and applied to ease the system evolution process, maintain high standards and reduce

The post is at London Headquarters and applications are invited from persons interested in working on design and implementation of significant schemes. Candidates should be of degree level and have several years experience including programming/systems analysis; design and implementation of application and or system software, traison with users from initial assessmen of specifications to system testing and acceptance; design and leadership responsibilities within a software project team framework. Applicants should also have an awareness of and interest in today's software design and

Experience with minicomputer or microcomputer system development, real-time operating systems, or the programming language CORAL, though not essential, would be an advantage. Necessary training would be given.

Each appointment will be within a salary range of £11,916-£15,081 per annum

Applications stating full relevant details and present salary to the Group Personnel Officer, CEGB, Sudbury House, 15 Newgate Street, London EC1A 7AU, by 7 July 1980 quoting appropriate reference.

CENTRAL ELECTRICITY GENERATING BOARD HEADQUARTERS

IBM OPERATORS

c. £5000 + 20% SHIFT ALLOWANCE + OVERTIME

Once again we are looking for experienced operators to fill the gaps left by transfers to our programming training scheme.

Applicants should have at least 6 months actual experience operating an IBM 370 range computer, in a multiprogramming environment, under DOSIVS, POWERIVS, Full working knowledge of POWERIVS commands.

Additional experience of operating TP processes and a working knowledge of EPAT and Catalogued Procedures would be of considerable advantage as would any commercial experience gained prior to operating.

commercial experience gained prior to operating.
The Save 4 Prosper Group was founded in 1934 and in addition to being Britain's largest unit trust group is also a major folice in life assurance; pensions and annutities.
Our main administrative offices are at Gamts Hill, liferd but we shall be relocating the Computer Dedartinghi to central Formford during the latter half of 1982.
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Vertous T.P. equipment local and remote.

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We are a propressive organisation whose policy is to promote from within, providing the area a propressive organisation whose policy is to promote from within, providing the area appropriation of the analysis of the propressive organisation whose policy is to promote from within, providing tomated FROSERAMING TRAINING course. Employee benefits include assisted early openation and its assurance, BUPA (early and dependents). Company As applicams will be terpeded in united size in history of the properties of the interview.

Pease contect M. Dickfreen on 0/1 less passis training will be interested as provided to the properties.

SAVE & PROSPER CROUP

STATE TO STATE THE STATE OF THE

Field Engineers Support Engineers

PRCI (UK) Limited is the British company of the world's largest information sciences corporation with a substantial investment programme in the UK. Just to prove the point to you, we are adding Manchester and Wakefield to our network.

We need support and field staff for those two new operating teams, and additional personnel in Twickenham.

You should have a good knowledge of engineering with particular reference to Digital Equipment Corporation or Prime operating

The benefits of working for us in these posts amount to about £12,000 p.a. including car health and salary protection schemes. In the longer term, career and salary opportunities are difficult to match and are worldwide.

Telephone or write with details to Barbara Clark, Planning Research Corporation International (UK) Limited, St George's House, Church Street, Twickenham,

Middlesex. Tel: 01-891 4021. Interviews will be held locally.

Planning Research Corporation International

Systems Programmers for new DP Centre, London

Our new DP Centre, houses two IBM 370/158AP processors, and is shortly to be supplemented by a 3033N. Our increasing commitment to terminal based systems has led to a need for. three more systems programmers with 2 to 3 years' experience of operating system and/or teleprocessing software and with a sound current knowledge of one or more of the following : MVS, SE, JES2, TSO, CICS, VSPC, ACF/VTAM in a system programming environment.

A highly competitive remuneration package is negotiable dependent upon experience and qualifications. Additional generous benefits include low-cost mortgage and non-contributory pension schemes together with flexible

Please forward a detailed curriculum vitae to : Ann Bazell, Staff Department, Prudential Assurance Co. Ltd. 142 Holborn Bars, London EC1N 2NH.

Prudential

Senior Systems Analyst Management Consultancy North West

to £12,500 Our olients are expanding their data project starting in the North West. To complete the team, they need two self-in cation of a Project Management information System.

As Consultains, their work includes most aspects of data processing; from application design through to systems software. Generally their work individuals and systems software. Generally their work individuals application design through to systems software. Generally their work individuals and systems software of the considerable opportunities exist for broadening or increasing your depth of knowledge. They offer interesting and varied work where personal fulfillment can be achieved whilst interesting of increasing your depth of knowledge. They offer interesting and varied work where personal fulfillment can be achieved whilst interesting of interesting of knowledge. They offer interesting and varied work where personal fulfillment can be achieved whilst interesting of the interesting of knowledge. They offer interesting and varied work where personal fulfillment can be achieved whilst interesting the underly of knowledge. They offer interesting and varied work where personal fulfillment can be achieved whilst interesting the interesting of knowledge. They offer interesting and varied work where personal fulfillment can be achieved whilst interesting the interesting of knowledge. They offer interesting and varied work where personal fulfillment can be achieved whilst interesting the achieved whilst interesting the achieved whilst interesting of knowledge. They offer interesting and varied work where personal fulfillment can be achieved whilst interesting and varied work where personal fulfillment can be achieved whilst interesting the achieved whilst interesting and varied work where personal fulfillment can be achieved whilst in

Austin panies in which you are not interested should be listed in a covering letter. Alverishe covering letter.

THINK BIG THINK FUTURE THINK PROCESS CONTROL

OPPORTUNITIES FOR SOFTWARE AND HARDWARE PEOPLE

- Salaries to £9,500 p.a.
- International travel
- Project responsibility
- Based in North Herts

Process control is one of the fastest growing sectors on the international scene and our client has bulging order books to prove it.

Demand for their digital process control and instrumentation systems has created brand new vacancies with excellent career development prospects for systems engineers, hardware engineers and applications programmers.

Ideally we are looking for people with mini computer or instrumentation background, possibly gained with a computer manufacturer. You should preferably have HNC or a degree in a numerate discipline and applications programmers should be familiar with at least one assembler level language.

The work could involve some overseas travel and you will be continually trained to keep your experience up to date with new technology. These are excellent opportunities for career minded men and women.

Salarles are competitive, working conditions are very good and the company will help with relocation costs where appropriate.

We have more information on the company, its products and its future plans. Call Mary Stone for the facts or write to the address below:



271 High Street Berkhamsted, Herts. Phone: (04427) 73151

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North West

London



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SYSTEMS & PROGRAMMING MANAGER

A major commercial organisation heavily involved in the glamorous film industry wishes to appoint a project leader type. He wil take total charge of a small stell involved wil take lotal charge of a small stall involved in various new application areas including Marketing. Finance and international M.I.S. Both IBM and minis are in operation so the right applicant should have suporvisory and at least 3 or 4 years COBOL experience, and can look forward to a first-rate career within this company.

OPERATORS

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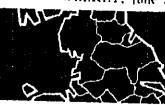
tatest ICL ME 29 on order which will be connected to large 2900s in the Midlands. They can offer to the right applicant (with at least, 2; yrs' experience), exciting manufacturing and commercial systems to be developed and implemented; Perka include 24.

days hole, and a non CPS and insurance schome. CW 26/3 Michael

Recruitment Consultants

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Data Express House, 3 Prospect Place, Heathfield Terrace, Chiswick W.4



NORTHERN APPOINTMENTS W

Where the grass better opportunity for is greener. people in DP to develop their careers in the North. Unfortunately the in-

dividual is often faced with a hewildering and confusing selection of seemingly good How do you sort the choose one with an office through asking relevant distributed processing, "wheat from the chaff"? Is it not only in the North but in questions, will be identithe right move for you?
Should you even be concentrated that the full range of skills and potential can be concentrated that the full range of skills and potential can be concentrated that the full range of the concentration of the concentr

Someone has to sort through the maze and plack talking "over a desk" with a out the right career oppor-consultancy, ask the contunity, the correct move for

sultant to explain the It is essential that the ganisation, what relevant person entrusted with this is experience the consultants a fellow professional with have, job and company practical experience in your specifications, procedure for submissions to prospec-

The consultancy should preferably be seen to have a policy of employing high calibre, mature and experienced consultants to professional his approach is enable the completion of to companies, the better

A professional consult- forms or hastily-prepared own resources. A professional consultancy has in-depth experience in creating job specifications; writing advertising copy; placing it in the right publications; ough to represent you and the right publications; ough to represent you and the right publications; ough to represent you and you feel comfortable, then the reviewing salary scales; in the state of the second consultance of the second terviewing and screening, you should start discussing presenting short lists; and your background and arranging letters of offers aspirations for the future. and subsequent acceptance. During your discussion

sidering moving from your opportunities available for are questions not easily career can readily be iden-

opportunities he will dis-When you are finally cuss the background of employers, including their employment package, relocation details, careor progression and working environment including the windows and doors to Nor-individual personalities thern opportunities you within these companies.

He will also be able to ered advise on housing in the North, areas to avoid, estate agents and mortgage companies to contact.

There are so many career opportunities not adverrecruiting assignments over a broad range of high technology industries.

The completion of the completion of the companies, the better pour individual can only hope to the completion of the c

expansion phases; and there grass is greener. are numerous user companies, from the smallest

While looking for the the consultant will be data processing installation professional consultancy, it building up a picture of your in Europe, undergoing de-

nology. Another advantage of the North for people moving into the area is housing, up to 50 per cent cheaper than comparable houses in the South.

ancy will guide you through the maze, and open may not even have consid-

bad experiences with the smaller consultancies, that time spent talking to a professional consultancy's Northern office could change your career direction and ultimately change

Your skills as a field en-

 The author is a senior mini through to the largest ester based firm, IMPC.



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Approx. £16,000 p.a. + car (+ guarantee)

Experienced Salesman to open up Leeds office, and sell minicomput systems in the East of the Pennines. Customers include large, well-known international companies. Products already have a 'Big' name and have 'Sold Well' for years.

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Our Clients require a self-supporting Sales Executive to be responsible for Sales and Support in Scotland. There is an existing user base and more to come. You will be selling a very successful internationally recognised minicomputer system. The whole system is 'UNIQUE.' Existing customers are household names.

These are new positions, and are the start of UK-wide expansion. GUARANTEED ANNUAL INCOME of £10k (... EVERY YEAR).



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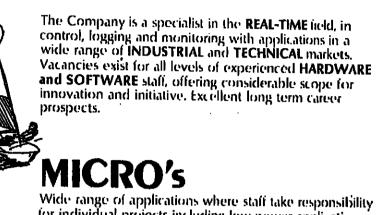
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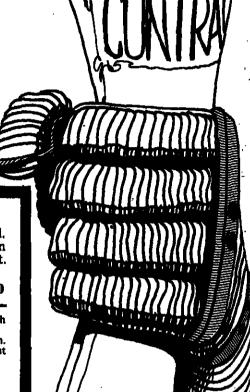
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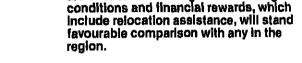
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YRS ANALYSIS YRS PROGRAMMING

The ambitions of programmers

Manchester Transport, having completed the preparation of a five year system development plan, set out to expand its systeins and data processing department to take on the extra work. About 20 people were involved of all skills and grades — from programmer to system de-

sign manager. Foday, about a year later, recruitment is nearly complete, but it has taken the whole year to achieve

Most difficult of all was the recruitment of programmers. It was impossible to recruit programmers with about two or three years' experience. People with this level of experience in programming appear to offer themselves only for more senior posts such as progrum designer (in GMT's case) or analyst/ programmer or even sys-

Contacts with other people in the trade indicate that this is not unique, either to the North
West or to public utilities
and local authorities. It
may, however, have
something to do with may, however, have something to do with salary levels and there is some evidence that although GMT pays slightly better than the median salary for programmers for this area profession or occupation this is not enough to retain

three years' experience in pure programming jobs.

Making a significant change to the salary for programmers, however, is not easy in a highly structured salary system such as public utilities and local authorities use. The development in such jobs. knock-on effect on the Atthis level, the abilities more senior grades is very difficult to cope with in such a structure.

in any case, only a limited number of programmers appear to want to stay in programming at mechanistic programming any salary. Most prefer to and systems analysis start broadening their skills

The author, William Drynan, is systems and DP manager with Greater Manchester Transport.

skills as soon as possible and the subjective feeling among candidates we interviewed was that about two years was enough in

To some extent this phenomenon repeats itself throughout the range of more senior posts. For jobs. The general picture seems to be of a population which seeks a rate of promotion very much faster than in any other

A more welcome aspect of this, of course, was that many candidates presented themselves for the system design management posts. However, many of these have a narrow basis for successful

to recognise and deal with general business problems and to relate effectively to departmental and functional management are more important than the more

The majority of candidates lacked these additional skills and the rate of movement of people within DP together with the "sealed" nature of the occupation makes it

to obtain such skills. In addition to these general trends, there were a number of problems associated with the fact that GMT is a public utility located in the North West. Many candidates, especially for the more senior posts, expressed concern about the hierarchical rigidity and old fashioned style (as they -which, may, in fact, be

difficult for those within

imagined them) of public utilities. This is more imaginary than real.

· As someone having experience of both private industry and public util-ltles I do not find it to be so. Most candidates who were interviewed appeared to satisfy themselves quite quickly from the nature and content of the interview that this would not be a problem for

As to the second matter, many candidates from the South and the Midlands were apprehensive about things such as the price of housing, the level of educational services and even, in one case, the availability of non-violent soccer matches.

However, I do not think this problem is unique to those recruiting in the North West. It is much more likely that people who hold these opinions strongly simply do not apply for jobs in the area.

Certainly, my experience is of hearing

nore people state passionately that they would rather work in any other part of the UK than central London.
All in all, the problems

GMT encountered during the last year's recruitment effort were more those shared by all DP managers, than those specific either to the North West or to public utilities.

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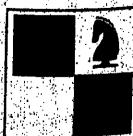
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umn many times before, the - ideal opportunity for the difference between sales success or failure is often no more than an attitude of

The winning of the order could affect your industry often depends on the ability quite considerably, it is positive stance within the take every possible step to sales situation rather than raise your efficiency to the become involved in the highest level in order to negative dialogue of all the ensure survival in what will

apparently entering a funds can still be made period of worldwide available, will avoid a poseconomic recession. I have sible situation where you always believed that there is are in urgent need of innothing more likely to creasing efficiency without than politicians and economic pundits fore thing - photocoplers to casting that we are about to aero-engines, vending

One could almost believe that economic recession is a standard product of Rent-a-Disaster, a service company specialising in the provision of calamities that appear to justify the government of the day and sustain full employment for MPs. But, I digress!

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What actually happens to the buying process during times of recession? Clearly t depends on the type of product one is selling. uxuries are obviously harder than essentials lowever, it is fair to say hat almost no market dries lways business around

fronment that the deternination to get out there and win enables some seleamen to shrug off the apparent limitations of

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resolute and determined mind. But it has always New premises been the salesman's res-

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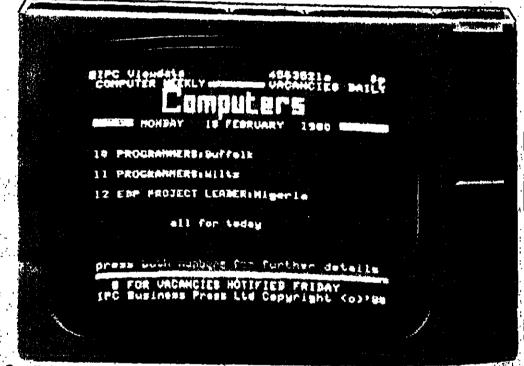
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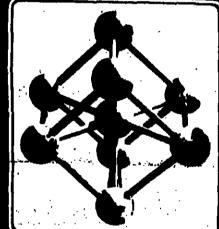
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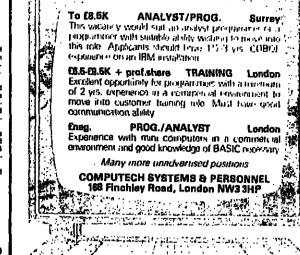
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